



# Northern New England Intercity Rail Initiative

BOSTON | SPRINGFIELD | NEW HAVEN | MONTREAL



## EXISTING CONDITIONS ASSESSMENT REPORT

DATE: JANUARY 2014





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## 1 CORRIDOR OVERVIEW

### 1.1 INTRODUCTION

This Corridor study examines the implementation and operation of more frequent and higher speed intercity passenger rail service along the Northern New England High Speed Rail Corridor. The rail corridor connects the cities of Boston, Massachusetts and New Haven, Connecticut via the City of Springfield, Massachusetts, and also Boston to Montreal, Quebec via the Springfield. The Study will focus on incremental infrastructure improvement concepts that will seek to maximize the use of existing rail corridors along the segment between Boston and Springfield, and the segments connecting Springfield to Montreal, Quebec and Springfield to New Haven.

The Existing Conditions Assessment summarizes the existing conditions found in the Corridor that may impact the development and feasibility of study options. The report has been prepared based on currently available existing information and data. The data was gathered from diverse sources, including publically available information, government reports, and partner railroads. The Existing Conditions Assessment includes three separate documents, including the following report, an Appendix and a Map Appendix.

The purpose of the data collection effort documented in the Existing Conditions Assessment is to provide the base information to initiate the future phases of the Study. The focus on infrastructure data collection was on major attributes of the Corridor, documented at a level necessary to support operational analysis, preliminary environmental screening, and bottom-up “order of magnitude” cost estimates of improvements. The environmental existing conditions information will serve both as a basis for environmental screening during development of infrastructure improvement options and as the base information for the Affected Environment information for the NEPA document.

### 1.2 STUDY CORRIDOR

The Corridor which runs from Boston to Springfield, MA and then splitting with one route heading north to Montreal, QC and the other heading south to New Haven, CT is 469 miles long. The Corridor consists of railroad right of way primarily built and engineered in the 19<sup>th</sup> and early 20<sup>th</sup> centuries, with significant structures along the length that are more than 100 years old. However, infrastructure conditions vary on the Corridor, depending primarily on operator and location. The entire NNEIRI Corridor is currently in use for freight, passenger, or both services and in a state of good repair.

For the purpose of the data analysis, the 469 mile Corridor is divided into three segments - Boston to Springfield, Springfield to Montreal, and Springfield to New Haven. Figure 1.1 shows a geographical representation of the Corridor and Table 2.1 highlights the Corridor’s owners.





Figure 1.1 NNEIRI Study Corridor



Table 1.1 Summary of Corridor Ownership

Segment	Owner	Miles
Boston to Worcester	Commonwealth of Massachusetts	44
Worcester to Springfield	CSX	55
Springfield to Northfield, MA	Pan Am Southern	49
Northfield, MA to East Alburgh, VT	NECR	206
East Alburgh, VT to Montreal	CN	53
Springfield to New Haven	AMTRAK	62

*Source: Google Maps and Railroad Track Charts*

## 2 CURRENT CONDITION AND CAPACITY OF EXISTING RAIL INFRASTRUCTURE

### 2.1 CURRENT INFRASTRUCTURE CONDITIONS

#### Bridges and Grade Crossings

The Corridor has frequent bridges and at-grade crossings along its length. Major bridges on the Corridor span rivers and other waterways, such as the Connecticut and St. Lawrence Rivers, while others are small structures over local roads. Additionally, two identifiable tunnels are on the Corridor – the Back Bay Tunnel in Boston, Massachusetts and the Bellows Falls Tunnel in Rockingham, Vermont.

At-grade crossings are also numerous on the Corridor, particularly outside major urban areas, with intersections as varied as major roads to farm crossings. At-grade crossings, particularly for trains operating at higher speeds, require specialized crossing gates and warnings. Faster service on the Corridor will require the upgrade of key bridges and at-grade crossings to meet FRA standards for higher frequency service and speeds. Table 2.1 summarizes total bridges and crossings on the Corridor by segment and Appendix Tables 1.28-1.30 have a complete description of crossings.

**Table 2.1 Bridges and Grade Crossings: NNEIRI Corridor Summary**

Rail Segment	Total Bridges and Crossings
Boston to Springfield	224
Springfield to Montreal	324
Springfield to New Haven	321

Corridor speeds are determined by FRA operating class. FRA classes provide for specified maximum speeds at which passenger and freight trains may operate. FRA operating classes are based on track geometry, condition, and maintenance standards. The Corridor is primarily Operating Class 3; however, segments are maintained and operated at higher levels, such as the Springfield to New Haven segment. Table 2.3 summarizes Corridor operating classes and Appendix Tables 1.12-1.14 summarize speeds and number of tracks by mile.



**Table 2.2 Summary Corridor Rail Classifications**

Rail Segment	Primary Operating Class	Maintenance Class	Notes
Boston to Worcester	3	4	Information is speculative, based on existing speed restrictions
Worcester to Springfield	3	-	Information is speculative, based on existing speed restrictions
Springfield to Montreal	3	4	Information is speculative, based on existing speed restrictions
Springfield to New Haven	4	4	Currently being upgraded to Class 6 by AMTRAK

*Source: AMTRAK, MBTA, and Freight Rail Operations*

### **Summary: Conditions from Boston to Springfield**

The Boston and Springfield segment is owned and maintained by the Commonwealth of Massachusetts from Boston to Worcester and CSX from Worcester to Springfield. The right of way is primarily a two tracks with some segments of single track operation, potentially limiting operations in certain segments.

The MBTA operates frequent commuter rail service from Boston to Worcester and AMTRAK's Lake Shore Limited provides service between Boston and Springfield, with continuing service to Chicago. Additional AMTRAK service also operates from South Station, Back Bay, and Springfield Union Station.

Stations on the Corridor with current AMTRAK service are Boston (South Station and Back Bay), Framingham, Worcester (Union Station), and Springfield (Union Station).

Additionally, the Corridor has fourteen MBTA commuter rail stations and a proposed commuter rail station in Boston's Allston/Brighton district (Boston Landing). All AMTRAK stations, and most MBTA commuter rail stations, are ADA accessible and most stations have adjacent parking. However, with the exception of stations in Boston, Worcester, and Springfield, none of the stations have comprehensive ticketing facilities, enclosed waiting areas, or other significant passenger amenities.

Existing conditions on the Boston to Springfield segment are detailed in the Appendix, including existing train departure schedules (Appendix Table 1.3 and 1.4), rail age and type (Appendix Table 1.15), tunnels (Appendix Table 1.31), vertical profiles/grades (Appendix Table 1.18), curves greater than 2 degrees 30 minutes (Appendix Table 1.20), and stations (Appendix Table 1.36).

### **Summary: Conditions from Springfield to Montreal**

The Springfield and Montreal segment is owned and maintained by Pan Am Southern from Springfield to Northfield, Massachusetts, NECR from Northfield to Rouses Point, Vermont, and CN from Rouses Point to Montreal. The Corridor is primarily single tracked but significant segments of double track exist outside Montreal and Springfield and the Corridor

has numerous sidings and passing tracks. Existing number of tracks for the Corridor by mile marker are outlined in Appendix Table 1.14.

AMTRAK's Vermonter provides service between Springfield and St. Albans, Vermont, originating in Washington, D.C and AMTRAK's Adirondack service operates along a segment of the Corridor between Montreal and Lacolle, Quebec. Additionally, VIA Rail and AMT operate significant service from Montreal Central Station for a short segment of the Corridor.

Stations on the Corridor with current or future AMTRAK service are Springfield (Union Station), Holyoke, Northampton, Greenfield, Brattleboro, Bellows Falls, White River Junction, Randolph, Windsor, Montpelier, Waterbury, Burlington (Essex Junction), St. Albans, St. Lambert, and Montreal (Central Station). Most AMTRAK stations are ADA accessible and provide adjacent parking facilities. However, outside Springfield, Montreal, and White River Junction, few stations provide ticketing and baggage facilities, significant passenger waiting areas, or other passenger amenities.

Existing conditions on the Springfield to Montreal segment are detailed in the Appendix, including existing train departure schedules (Appendix Table 1.5-1.7), rail age and type (Appendix Table 1.16), tunnels (Appendix Table 1.32), vertical profiles/grades (Appendix Table 1.19), curves greater than 2 degrees 30 minutes (Appendix Table 1.20), and stations (Appendix Table 1.36).

#### **Summary: Conditions from Springfield to New Haven**

The Springfield to New Haven Corridor is owned and maintained by AMTRAK. Historically, the Corridor is a double track railroad; however, AMTRAK removed or abandoned significant segments of double track in the 1990s to save on maintenance costs. Currently, approximately 25 miles the Corridor is double-tracked and the remaining 37 miles is single track. CTDOT is undertaking a program to double track the Corridor to accommodate additional NHHS commuter rail service. Existing number of tracks for the Corridor by mile marker are outlined in Appendix Table 1.16.

AMTRAK operates the Vermonter, Northeast Regional, and New Haven to Springfield Shuttle on the Springfield to New Haven segment. Additional AMTRAK service also operates from Springfield (Union Station) and New Haven (Union Station). CTDOT will also begin operation of the NHHS commuter rail in 2016 and open new stations at Enfield, West Hartford, Newington, and North Haven/Hamden.

Existing AMTRAK stations on the Corridor include Springfield (Union Station), Windsor Locks, Windsor, Hartford (Union Station), Berlin, Meriden, and New Haven (Union Station). Most stations are ADA accessible and have adjacent parking facilities. However, outside Springfield, Hartford, and New Haven, stations do not have baggage facilities or significant passenger amenities.

Existing conditions on the Springfield to New Haven segment are detailed in the Appendix, including existing train departure schedules (Appendix Table 1.8 and 1.9), rail age and type (Appendix Table 1.17), curves greater than 2 degrees 30 minutes (Appendix Table 1.22), and stations (Appendix Table 1.36).

### 3 CURRENT MIX OF RAIL SERVICES

The Corridor has variable levels of freight and passenger rail services that operate among the various segments. The busiest segment is between Boston and Worcester, where 23 round trip passenger MBTA and AMTRAK trains operate daily. The least used segment is from St. Albans, Vermont to Lacolle, Quebec, where no passenger service is operated. Freight operations also vary by segment and operator. Appendix Tables 1.3-1.9 outline intercity and commuter passenger rail service on the Corridor.

#### **3.1 OPERATING RIGHTS – FREIGHT**

##### **Boston to Springfield**

CSX is the rail operator between Boston and Springfield. CSX operates a limited number of trains between Boston and Framingham and recently constructed a large intermodal facility located in Worcester.

##### **Springfield to St. Albans**

NECR and PAS operate regular freight service along the Corridor. Several other railroads have operating rights in the corridor including CN, Vermont Railway, Washington County Rail Corporation (Vermont Rail Systems), and Claremont Concord Railroad Corporation. Most northbound NECR freight is switched to CN operations at St. Albans.

##### **St. Albans to Montreal**

CN freight service operates along the entire St. Albans to Montreal Corridor segment, with the exception of a short stretch leading to Central Station in Montreal. Most southbound freight operated by CN is switched to NECR operations at St. Albans.

##### **Springfield to New Haven**

Freight railroads including the Connecticut Southern, Pan Am Southern, Providence & Worcester, New England Central and CSX operate on the Springfield to New Haven segment of the Corridor.

**Table 3.2. Summary: Weekday Freight Operations**

Segment	Operator(s)	Regular Weekday Roundtrips
Boston to Worcester	CSX	2-3
Worcester to Springfield	CSX	25
Springfield to St. Albans	NECR	1 and Local Services
St. Albans to Montreal	CN	1-30
Springfield to New Haven	Connecticut Southern, Pan Am Southern, Providence & Worcester, and CSX	9

*Source: State Environmental Documents*

### 3.2 OPERATING RIGHTS – PASSENGER RAIL

Passenger rail operations on the Corridor vary significantly by segment, with a current high of 23 daily roundtrips on the Boston to Worcester segment to a low of one roundtrip on the Springfield to St. Albans and Springfield to Worcester segments. Additionally, the Corridor is expected to see significantly increased service on the Springfield to New Haven segment under existing CTDOT and AMTRAK plans. Passenger rail service is summarized in Table 3.2 .

#### Boston to Springfield

MBTA and AMTRAK operate passenger rail services on the Corridor from Boston to Springfield. The Corridor begins at South Station in Boston, where the Corridor shares right of way with the Northeast Corridor for a one mile segment to Back Bay Station. After Back Bay Station, the Corridor continues west with service on MBTA's Framingham/Worcester Commuter Rail line, which runs 22 local and express roundtrip trains each day. MBTA utilizes a variety of diesel locomotive and coach types for its service on the Corridor.

AMTRAK operates Lake Shore Limited service to Springfield Union Station (with continued service to Albany and Chicago), with one train per-day in each direction. AMTRAK service is operated using diesel locomotives and Amfleet and Viewliner passenger coaches.

#### Springfield to St. Albans

AMTRAK operates a single roundtrip train, the Vermonter, daily from Washington, D.C. to St. Albans, Vermont. Currently, service operates along a route between Springfield and St. Albans that takes it eastward along the CSX line to Palmer before changing directions to head north, stopping in Amherst, Massachusetts and rejoining the Corridor in East Northfield, Massachusetts.

A project is currently underway to improve the route that the Vermonter takes in Massachusetts. This project, known as the Knowledge Corridor, will add three additional station stops in Massachusetts – Holyoke, Northampton, and Greenfield.

The Vermonter has nine station stops in Vermont, including Brattleboro, Bellows Falls, Windsor-Mt. Ascutney, White River Junction, Randolph, Montpelier, Waterbury, Essex Junction, and St. Albans with one in New Hampshire at Claremont. Six stations in Connecticut include Windsor Locks, Hartford, Berlin, Meriden, Wallingford, and New Haven (Union Station). Additional service is provided to points south in Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, and Washington, D.C. The Service is operated using diesel locomotives and Amfleet passenger coaches.

### St. Albans to Montreal

CN operates commuter rail service for Montreal's Metropolitan Transportation Agency (Agence Métropolitaine de Transport or AMT) in the vicinity of Montreal. AMTRAK and VIA Rail operate long-distance passenger service to points in eastern Canada and New York State. The Corridor has no existing passenger service between Lacolle, Quebec and St. Albans, Vermont.

Service from Central Station includes AMT's Deux-Montagnes Mont-Saint-Hilaire, and Mascouche (under construction) commuter rail, AMTRAK's Adirondack line, and VIA Rail's Montrea-Senneterre, Montreal-Jonquiere, Ocean, Montreal-Gaspé, Montreal-Quebec, Ottawa-Montreal, and Toronto-Montreal long distance trains. AMTRAK service is operated using diesel locomotives and Amfleet passenger coaches.

### Springfield to New Haven

Rail service from Springfield to New Haven is currently operated by AMTRAK, which operates the Vermonter, Northeast Regional, and New Haven-Springfield Shuttle service. Service is operated using diesel locomotives and Amfleet passenger coaches. Service on the New Haven-Hartford-Springfield (NHHS) Rail Project is expected to begin in 2016; station stops will include one Massachusetts stop, Springfield, and stops in Connecticut, Windsor Locks, Windsor, Hartford, Berlin, Meriden, Wallingford, New Haven (State Street Station), and New Haven (Union Station).

**Table 3.2 Summary: Weekday Revenue Passenger Service**

Segment	Operator(s)	Existing Revenue Roundtrips	Proposed Revenue Roundtrips
Boston to Worcester	MBTA, AMTRAK	23	23
Worcester to Springfield	AMTRAK	1	1
Springfield to St. Albans	AMTRAK	1	1
Montreal and to St. Lambert	AMTRAK, VIA Rail, AMT	13	13
Springfield to New Haven	AMTRAK	6-8	25

*Source: MBTA and AMTRAK Timetables (2013)*

## 4 EXISTING PLANS FOR FACILITY IMPROVEMENTS

Governments in Connecticut, Massachusetts, Quebec, and Vermont have ambitious plans for improving passenger and freight rail service on the Corridor. The projects are numerous and include intercity, commuter, transit, and freight related projects. All existing projects will add service to the Corridor and promote complementary travel modes for NNEIRI passengers.

### 4.1 BOSTON-WORCESTER COMMUTER RAIL SERVICE, MASSACHUSETTS

MassDOT and MBTA have plans to improve frequency on the Framingham/Worcester Commuter Rail Line. In the 2010 Massachusetts State Rail Plan, the state committed to improving frequencies on the line by adding 20 new weekday commuter rail trips to Worcester.<sup>1</sup> The increased frequency on the Framingham/Worcester Line was made possible due to an agreement with CSX, where the freight railroad agreed to relocate most operations from Boston's Beacon Park Yard to an expanded intermodal center in Worcester.

Additionally, the Framingham/Worcester Commuter Rail Line will benefit from MBTA's plan to acquire new commuter rail equipment. The acquisitions will include 75 new bi-level passenger coaches new locomotives.<sup>2</sup>

### 4.2 NEW HAVEN-HARTFORD-SPRINGFIELD RAIL PROJECT, CONNECTICUT AND MASSACHUSETTS

CTDOT, with support from MassDOT, is expanding rail service on the 62 mile New Haven-Hartford-Springfield (NHHS) Corridor. The plan will include installing more than 20 miles of double track and rebuilding and improving stations.<sup>3</sup> The project is projected to "increase the safety, quality, frequency, reliability, and speed of passenger service along the NHHS Corridor" and handle train ridership growth in the Northeast market; AMTRAK expects passengers to double by between 2012 and 2030 on the Northeast Corridor.<sup>4</sup>

The NHHS project will allow for an increase train service from six to eight round trips each day to 25 daily round trips on the NHHS Corridor and improve train speeds from a maximum of 80 mph to 110 mph.<sup>5</sup> The project will improve existing stations along the Corridor, including a nearly complete rebuilding of Meriden, Berlin, Windsor, Windsor Locks, and significant improvements to Hartford Union Station, New Haven State Street Station, and

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<sup>1</sup> Massachusetts State Rail Plan, Page 5-6.

<sup>2</sup> Ibid.

<sup>3</sup> Massachusetts State Rail Plan, Page 5-15

<sup>4</sup> "New Haven-Hartford-Springfield Rail Corridor High Speed Intercity Passenger Rail Project; Finding of No Significant Impact." Federal Railroad Administration, July 2012, Page 7.

<sup>5</sup> Ibid.



Springfield Union Station. Additionally, new stations will be built at North Haven, Newington, West Hartford, and Enfield. Also, new maintenance facilities, double track segments, sidings, and improvements to bridges and culverts will contribute to the improved operational capabilities of the project.<sup>6</sup>

#### **4.3 KNOWLEDGE CORRIDOR IMPROVEMENTS, MASSACHUSETTS**

The Knowledge Corridor is a MassDOT project to improve passenger service on AMTRAK's Vermonter service. The Knowledge Corridor will reroute Vermonter trains between Springfield, Massachusetts and Brattleboro, Vermont to Pan Am Southern tracks west of the Connecticut River and provide for station stops at Holyoke, Northampton, and Gardener. The FRA awarded MassDOT a \$70 million grant to improve the 49 mile segment and build two new stations.<sup>7</sup> The improved service will shorten the journey between Brattleboro and Springfield by 25 minutes and serve larger population centers than the existing right of way. Additionally, the Knowledge Corridor will improve operations for AMTRAK by allowing the railroad to use one less locomotive; an additional locomotive on the Vermonter is currently necessary to allow trains to make a reverse maneuver at Palmer.

#### **4.4 NECR VERMONT ARRA IMPROVEMENTS, VERMONT**

NECR received a \$52 million American Recovery and Reinvestment Act funding grant to upgrade the NECR right of way through Vermont with continuously-welded rail (CWR), new ties, rail crossing improvements and other upgrades.<sup>8</sup> Work on the project has mostly been completed, but NECR continues to perform some necessary upgrades. The project will improve the reliability of AMTRAK service on the Corridor.

#### **4.5 MONTREAL COMMUTER RAIL SERVICE IMPROVEMENTS, QUEBEC**

AMT is expanding commuter rail operations in Greater Montreal with two projects that will impact usage of Central Station. The agency is currently building a new commuter rail line, beginning at Central Station and terminating at Mascouche, Quebec, known as the Train de l'Est project.<sup>9</sup> The line will provide service to eastern Montreal and northeast suburbs with service expected to begin in 2014. Additionally, AMT is planning to increase service on existing rail lines and has long-term plans to electrify all commuter rail lines.

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<sup>6</sup> "New Haven-Hartford-Springfield Rail Corridor High Speed Intercity Passenger Rail Project; Finding of No Significant Impact," Pages 9-10.

<sup>7</sup> Massachusetts State Rail Plan, Page 5-15.

<sup>8</sup> "Amtrak Vermonter Returns." Vermont Agency for Transportation, September 29, 2011, <http://www.aot.state.vt.us/Irene/AmtrakVermontReturns.htm>

<sup>9</sup> "Projects." AMT, [amt.qc.ca/tde](http://amt.qc.ca/tde), accessed October 16, 2013

#### 4.6 MONTREAL TO NEW YORK CITY HIGH SPEED RAIL STUDY, NEW YORK AND QUEBEC

The New York State Department of Transportation and the Quebec Ministry of Transportation (MTQ) partnered to create a study on the feasibility of HSR service between Montreal and New York City. MTQ's study analyzed the existing CN and CP right of ways from Montreal to the Canadian border, either of which could be used by Inland Corridor service, highlighted in Figure 4.1.<sup>10</sup>

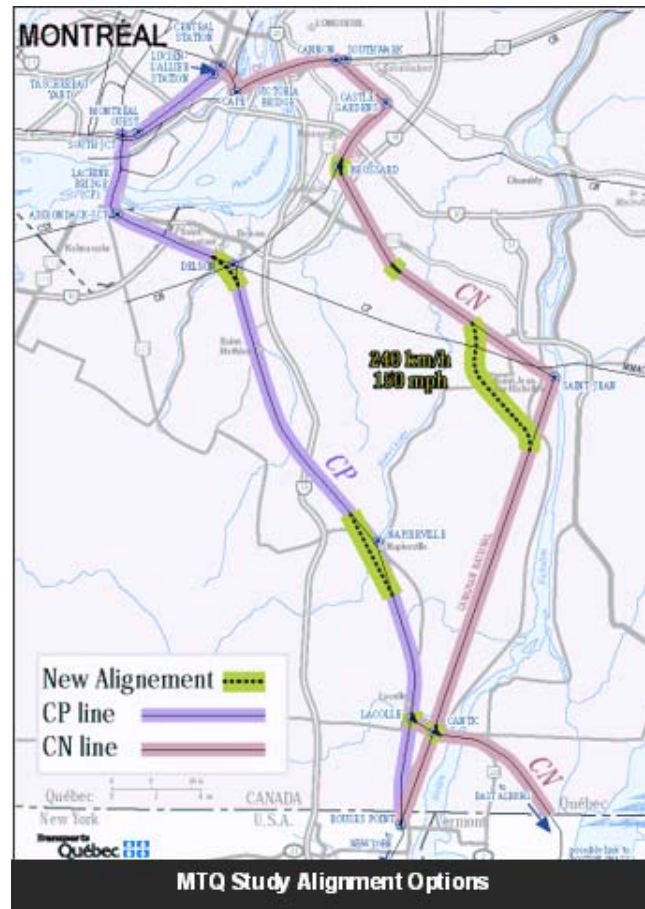


Figure 4.1. MTQ Montreal to New York City Alignment Options<sup>11</sup>

Overall, the study found full HSR service “effective but costly” and would reduce travel time from New York City to Montreal from 10:15 hours to 4:05 hours, assuming trains traveled

<sup>10</sup> Using the CP Line would require trains utilize Lucien-L’Allier Station in Montreal rather than Central Station.

<sup>11</sup> “Montreal-New York High Speed Rail Project.” Quebec Ministry of Transportation, [http://www.mtq.gouv.qc.ca/portal/page/portal/entreprises\\_en/transport\\_ferroviaire/thv\\_mtl\\_ny](http://www.mtq.gouv.qc.ca/portal/page/portal/entreprises_en/transport_ferroviaire/thv_mtl_ny), accessed October 18, 2013

150 mph.<sup>12</sup> MTQ modeled full HSR implementation on the Rouses Point to Montreal segment, which would cost \$80-110 million (U.S. Dollars) and reduce travel times from two hours to 30 minutes.

MTQ also modeled an incremental approach, where existing tracks were utilized and improvements made at key areas for the Rouses Point to Montreal segment. Assuming an incremental approach that allowed trains to operate at 125 mph, capital costs would be \$25-35 million (U.S. Dollars) and travel time would be 35 minutes.<sup>13</sup> MTQ's analysis found the existing CN and CP tracks already in good condition and able to accommodate improved service with relatively minor changes.<sup>14</sup>

#### **4.7 SOUTH STATION, BOSTON, MASSACHUSETTS**

South Station currently operates at capacity for train movements at peak hours.<sup>15</sup> MassDOT is developing plans to expand the station to accommodate future demand and planned expansion of both AMTRAK and MBTA operations. Expansion plans would include new seven new tracks, platforms, interlockings, train layover facility, and passenger waiting space.<sup>16</sup> Additionally, plans call for improved public access to South Station, enhanced streetscape, and reopening public access to Dorchester Avenue.<sup>17</sup> Expanding South Station will improve on-time performance for AMTRAK and MBTA service and allow for expanded service on new lines and higher frequencies. MassDOT currently has no public timetable for project start or completion. Expanding South Station will require relocating the U.S. Post Office's (USPS) General Mail Facility on Dorchester Avenue and moving USPS operations a new location.<sup>18</sup>

Additionally, Hines Interests, a Houston, Texas based company, owns air rights over South Station and has plans for a tower on the site; the proposed tower will be 49 stories and 980,000 square feet with retail, office, hotel, residential, and parking facilities.<sup>19</sup>

#### **4.8 UNION STATION, SPRINGFIELD, MASSACHUSETTS**

Springfield Union Station currently is a small facility operated by AMTRAK. However, the Springfield Redevelopment Authority (SRA) is restoring the main station building –

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<sup>12</sup> "Montreal-New York High Speed Rail Project." Quebec Ministry of Transportation, [http://www.mtq.gouv.qc.ca/portal/page/portal/entreprises\\_en/transport\\_ferroviaire/thv\\_mtl\\_ny](http://www.mtq.gouv.qc.ca/portal/page/portal/entreprises_en/transport_ferroviaire/thv_mtl_ny), accessed October 18, 2013

<sup>13</sup> "Montreal-New York High Speed Rail Project."

<sup>14</sup> "Montreal-New York High Speed Rail Project."

<sup>15</sup> "South Station Expansion." Massachusetts Department of Transportation, <http://www.massdot.state.ma.us/southstationexpansion/Home.aspx>, accessed October 16, 2013

<sup>16</sup> Ibid.

<sup>17</sup> Ibid.

<sup>18</sup> Massachusetts State Rail Plan, Page 5-20

<sup>19</sup> "South Station." Hines Interests, <http://www.hines.com/property/detail.aspx?id=144>, accessed October 16, 2013

including its central concourse and passenger tunnel – and creating of new vertical access points between the tunnel and platforms. Additionally, a new bus terminal with intercity service and a parking garage will be integrated into the station.<sup>20</sup>

#### **4.9 CENTRAL STATION (GARE CENTRALE), MONTREAL, QUEBEC**

See Chapter 7 for specific upgrades to Central Station’s customs and immigration systems.

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<sup>20</sup> “Springfield, MA.” Greater American Stations, <http://www.greatamericanstations.com/Stations/SPG>, accessed October 16, 2013.

## 5 2035 PLANNED FUTURE SERVICE LEVELS

Based on existing plans, rail service on the Corridor in 2035 will be heavier than current levels for both freight and passenger rail. Although the Corridor is projected to see an increase in traffic, it will not be as busy as other rail lines in the region, such as the Northeast Corridor. Table 5.1 summarizes existing and future weekday intercity and commuter rail on the corridor that is planned based on previously progressed efforts. The NNEIRI will use this information as the base on which to evaluate implementation of additional or modified services along the Corridor.

**Table 5.1. Summary: Weekday Revenue Passenger Service**

Segment	Operator(s)	Existing Revenue Roundtrips	Proposed Revenue Roundtrips
Boston to Worcester	MBTA, AMTRAK	23	23
Worcester to Springfield	AMTRAK	1	1
Springfield to St. Albans	AMTRAK	1	1
Montreal and to St. Lambert	AMTRAK, Via Rail, AMT	13	13
Springfield to New Haven	AMTRAK	6-8	25

*Source: MBTA and AMTRAK Timetables (2013)*

### 5.1 FREIGHT

Freight service levels on the Corridor will have a significant impact on passenger rail operations. With the exception of the Boston to Worcester and Springfield to New Haven segments, the Corridor is owned by freight operators. Therefore, significant cooperation is necessary to ensure access to the rail segments and priority in passenger rail operations. Table 5.2 summarizes freight operations on the Corridor. Additional information regarding freight rail service growth along the corridor will be gathered as the study progresses so that capacity analyses can be conducted.

**Table 5.2. Summary: Weekday Freight Service**

Segment	Operator(s)	Regular Weekday Roundtrips
Boston to Worcester	CSX	2-3
Worcester to Springfield	CSX	25
Springfield to St. Albans	NECR	1 and Local Services
St. Albans to Montreal	CN	1-30
Springfield to New Haven	Connecticut Southern, Pan Am Southern, Providence & Worcester, and CSX	9

*Source: State Environmental Documents*

## Boston to Springfield

Freight on the Boston to Springfield corridor is operated by CSX on the Boston Line. The Boston Line begins in Boston, Massachusetts and continues to West Springfield, Massachusetts. In West Springfield, the line connects to the Berkshire Line, which continues to the Selkirk Yard, located eight miles south of Albany, New York.

CSX currently provides through-freight between the Worcester Intermodal Terminal and the Selkirk Yard. The Selkirk Yard is the major junction and reclassification yard for CSX in the Northeast and a key component of the CSX system. CSX currently operates 25 roundtrip trains per week to the Worcester Intermodal Terminal; however, the number of trains will decrease to 21 when the corridor double-stacking project is completed.<sup>21</sup> CSX provides intermodal service and domestic lane routes between Massachusetts and points in the Midwest and Southeast. Additionally, CSX also operates local routes between Framingham and Worcester, and Framingham and Chelsea/Everett industrial areas via the Grand Junction Branch.

CSX Intermodal, a subsidiary of CSX, operates several facilities on the Corridor.<sup>22</sup> Current CSX Intermodal Facilities on the Corridor include:

- Worcester Intermodal Terminal – a recently redeveloped and expanded 79 acre intermodal terminal located near Downtown Worcester, Massachusetts.<sup>23</sup>
- TRANSFLO Terminal in Westborough – a recently redeveloped bulk transfer facility located near the Interstates 90 and 495 junction in Westborough, Massachusetts.
- Automotive Distribution Center in East Brookfield/Spencer – an intermodal automobile distribution site on the border between East Brookfield and Spencer, Massachusetts
- Framingham Freight Yard – a yard located near Downtown Framingham, Massachusetts that is primarily used for freight distribution in eastern Massachusetts.

The entire Boston Line is rated to carry 310,000 pound shipments, significantly higher than other lines in the state that are only rated for 263,000 pound shipments. Additionally, CSX is building major intermodal centers to accommodate 9,000 foot trains.<sup>24</sup> Future freight service between Boston and Springfield will change by 2035. As part of a 2009 agreement with the Commonwealth of Massachusetts, CSX invested in large intermodal facilities in Worcester,

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<sup>21</sup> “CSX Worcester Expansion Project; Certificate of the Secretary of Energy and Environmental Affairs on the Environmental Notification Form.” Massachusetts Executive Office of Energy and Environmental Affairs, Page 7. <http://www.telegram.com/assets/pdf/WT173861222.PDF>

<sup>22</sup> “Merrick-Memorial Neighborhood Redevelopment Plan.” Pioneer Valley Planning Commission, December 2004, Page 2-18. [http://www.pvpc.org/web-content/docs/transp/merr\\_redeplan.pdf](http://www.pvpc.org/web-content/docs/transp/merr_redeplan.pdf)

<sup>23</sup> “CSX Worcester Expansion Project; Certificate of the Secretary of Energy and Environmental Affairs on the Environmental Notification Form.” Massachusetts Executive Office of Energy and Environmental Affairs, Page 2. <http://www.telegram.com/assets/pdf/WT173861222.PDF>

<sup>24</sup> “CSX Worcester Expansion Project; Certificate of the Secretary of Energy and Environmental Affairs on the Environmental Notification Form.” Massachusetts Executive Office of Energy and Environmental Affairs, Page 6. <http://www.telegram.com/assets/pdf/WT173861222.PDF>



Westborough, and West Springfield Massachusetts, eliminating most operations at Beacon Park Yard in Boston. Additionally, CSX and Massachusetts are jointly paying for the raising of 31 bridges between Worcester and the New York State line to allow for double-stacked freight on the Corridor. Double-stacked freight rail allows freight operating companies to move items more efficiently than traditional freight trains. The historic agreement between CSX and Massachusetts also makes the provision for future shared passenger and freight movements.

### Springfield to St. Albans

Pan Am Southern and NECR operate segments of the Corridor from Springfield to St. Albans, with most northbound freight from St. Albans continuing as CN operations.

Leaving Springfield, the Corridor operates on the Knowledge Corridor; the Knowledge Corridor is owned by the Commonwealth of Massachusetts, which provides operating rights to Pan Am Southern service, jointly owned consortium of Pan Am Railways and Norfolk Southern. Pan Am Southern operates 11 trains per day with 20-50 box cars per train set. Freight trains are certified to operate at or below 40 miles per hour.<sup>25</sup>

The Corridor switches to the NECR main line in East Northfield, Massachusetts. The NECR mainline operates between New London, Connecticut and St. Albans, Vermont and is rated for 263,000 pound loading.<sup>26</sup> Annual carloads handled by the NECR are in excess of 38,000, with a wide variety of products.<sup>27</sup> NECR operates intermodal offloading and warehousing facilities in Vermont, Massachusetts and Connecticut.<sup>28</sup>

Daily freight operations on the NECR line include one through freight operating between St. Albans and Palmer, Massachusetts with up to 90 cars. Additionally, daily local trains include:

- Local freight between East Northfield, Massachusetts and St. Albans, Vermont
- Local freight between East Northfield, Massachusetts and Bellow Falls, Vermont
- Local freight operated between Deerfield, Massachusetts and Palmer, Massachusetts
- Local coal train operated between Deerfield, Massachusetts and Reading, Vermont
- Local freight operating between Claremont, New Hampshire and Walpole, New Hampshire

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<sup>25</sup> “Environmental Assessment; Knowledge Corridor – Restore Vermonter, Springfield to East Northfield, Massachusetts.” Massachusetts Department of Transportation, <http://www.massdot.state.ma.us/knowledgecorridor/VermontEA/Restore%20Vermont%20Environment%20Assessment.pdf>, accessed January 16, 2014, Page 27

<sup>26</sup> VT. State Rail and Policy Plan, 2006. Page 39  
[http://vtransplanning.vermont.gov/sites/aot\\_policy/files/documents/planning/AOT-PLN-Rail\\_PP\\_fullreport.pdf](http://vtransplanning.vermont.gov/sites/aot_policy/files/documents/planning/AOT-PLN-Rail_PP_fullreport.pdf)

<sup>27</sup> Vermont State Rail and Policy Plan, Page 19

<sup>28</sup> Vermont State Rail and Policy Plan, Page 19

NECR owns the railroad between Rouses Point and St. Albans, freight is changed to CN operations at the St. Albans Yard.

### St. Albans to Montreal

CN operates freight rail from St. Albans to Montreal, except for a short segment leading to Montreal Central Station, which is exclusively used by passenger rail trains.

In St. Albans, mainline freight is switched between NECR and CN operations. One daily roundtrip between St. Albans and Montreal is operated by CN, which also provides local service between St. Albans and East Alburg. After East Alburg, the line switches to the lightly used Rouses Point Subdivision and travels to Cannon, just outside of Montreal. Most freight trains on the segment are based at the Triage Taschereau Yard. Five or six trains typically operate on the segment daily.<sup>29</sup>

Freight service in the vicinity of Montreal includes CN main line traffic to and from Eastern Quebec and the Maritimes, limited local service and traffic to/from the Rouses Point Subdivision.<sup>30</sup> The line reportedly averages 25 to 30 train movements daily.<sup>31</sup>

### Springfield to New Haven

Freight operations from Springfield to New Haven are coordinated by AMTRAK and tracks are used by a variety of carriers, including Connecticut Southern, Pan Am Southern, Providence & Worcester, and CSX. The carriers have approximately nine trips each day on the Corridor; however, schedules vary by season and demand.<sup>32</sup> Tracks are currently allowed to carry 266,000 pound shipments. The Corridor in Connecticut has no intermodal yards but has several rail freight related yards:

- Cedar Hill Yard - located east of New Haven, straddles parts of New Haven and North Haven. Formerly a classification yard, the yard is currently used by CSX for limited freight operations according to sources.
- Hartford Yard – a rail yard used by Connecticut Southern and Pan Am Southern trains in Hartford, Connecticut.<sup>33</sup>
- New Britain Yard – a general purpose rail facility used by Pan Am Southern trains in New Britain, Connecticut.<sup>34</sup>

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<sup>29</sup> “Final Report; Boston to Montreal High-Speed Rail Planning and Feasibility Study Phase I.” Vermont Agency of Transportation, New Hampshire Department of Transportation, Massachusetts Department of Transportation, December 2003. Page 2-5.

<sup>30</sup> “Final Report,” Page 2-8.

<sup>31</sup> “Final Report,” Page 2-8

<sup>32</sup> “New Haven-Hartford-Springfield Commuter Rail EA.” Page 154.

<sup>33</sup> Connecticut State Rail Plan, Page 248

<sup>34</sup> Connecticut State Rail Plan, Page 12

## 5.2 COMMUTER RAIL

Commuter rail service across the Corridor will see significant increases in frequency and miles served by 2035.

### Boston to Springfield

In 2012, the Commonwealth of Massachusetts acquired the Corridor right of way from Boston to Worcester from CSX. As part of the agreement, CSX will relocate most freight operations from the Boston to Worcester segment, allowing the state to increase frequency and reliability of passenger rail on the segment. In 2035, 22 express and local MBTA commuter rail trains will operate from Boston to Worcester. Additionally, a new station at Boston Landing in Boston's Allston/Brighton neighborhood will be in service.

Currently, no commuter rail service exists between Worcester and Springfield and no existing plans call for new commuter rail service between the cities.

### Springfield to St. Albans

Currently, no commuter rail service exists between Springfield and St. Albans and no existing plans call for new commuter rail service between the cities.

### St. Albans to Montreal

Significant expansion of Montreal's Commuter Rail network is expected by 2035. Service on the Mont-Saint-Hilaire Line, operating on the Corridor from Montreal (Central Station) to a junction in Longueuil, Quebec, is expected to increase in frequency and potentially be electrified. Service will also increase on the Deux-Montagne Line, operating north from Central Station. Additionally, the Mascouche Line, currently under construction, will be operational by 2035 and with service terminating at Central Station.

No commuter rail service is expected on the Corridor between St. Albans, Vermont and Longueuil, Quebec by 2035.

### Springfield to New Haven

Currently, no commuter rail service operates on the Corridor between Springfield and New Haven. However, beginning in 2016, CTDOT will open the NHHS Commuter Rail Line. The line will utilize all existing AMTRAK stations on the Corridor and add stations in Enfield, West Hartford, Newington, and North Haven. Initially, NHHS service will operate 16 round trip trains daily, with 30 minute service during peak hours. Future service could expand the NHHS to 25 round trip trains daily, with additional peak hour service and expanded late

night and early morning hours.<sup>35</sup> Figure 5.1 shows future NHHS rail service, with existing and future stations.

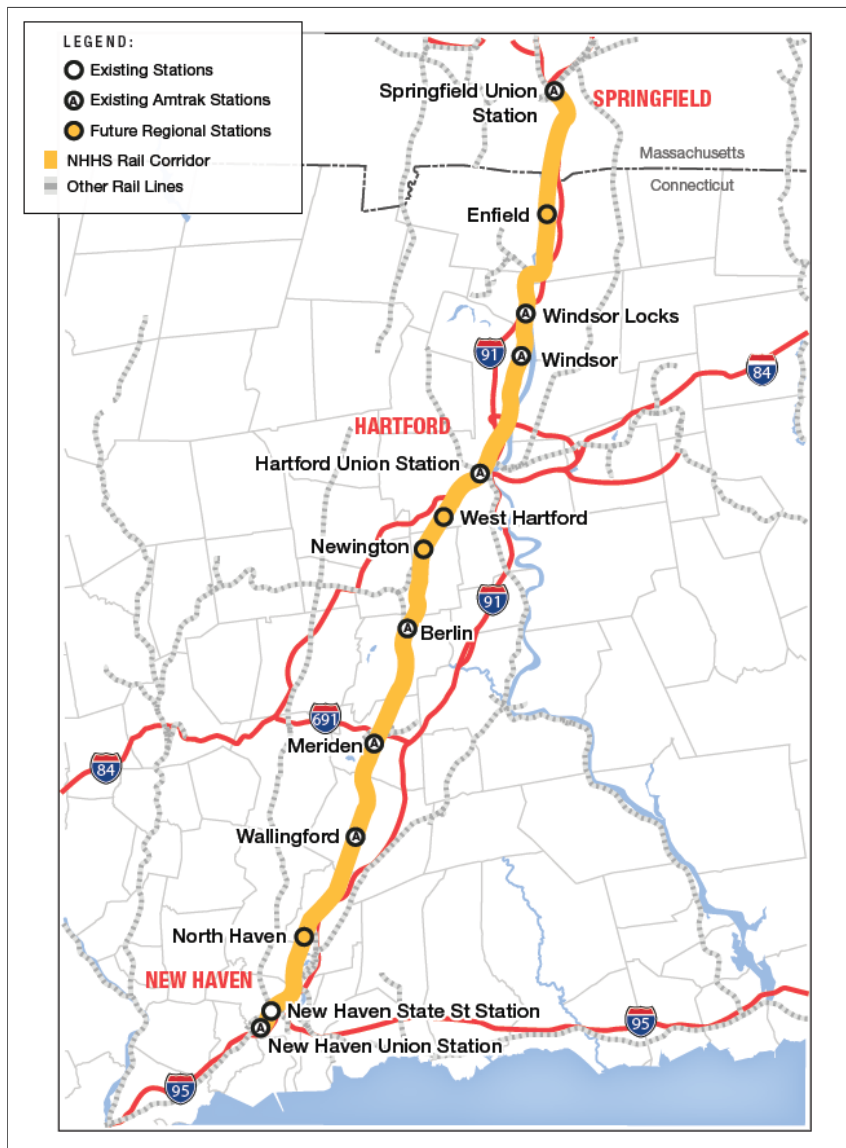


Figure 5.1 Future NHHS Commuter Rail Service<sup>36</sup>

<sup>35</sup> Stannard, Ed. "Conn. Seeks Funds for Rail Work on Hartford-to-Springfield Line." *New Haven Register*, April 6, 2011. <http://www.nhregister.com/general-news/20110406/conn-seeks-funds-for-rail-work-on-hartford-to-springfield-line-document>

<sup>36</sup> "NHHS Project Map." Connecticut Department of Transportation, <http://www.nhhsrail.com/>, accessed November 4, 2013

### 5.3 INTERCITY PASSENGER RAIL

Intercity passenger rail operates over the entire Corridor with the exception of a segment between St. Albans, Vermont and Lacolle, Quebec. Existing intercity rail service is not expected to change significantly before 2035, with the exception of any improvements resulting from NNEIRI.

#### Boston to Springfield

Currently, AMTRAK's once a day Lake Shore Limited service operates from Boston to Chicago. The Commonwealth of Massachusetts has no plans for additional passenger Rail between Springfield and Boston with the exception of any service resulting from the Inland Route.

#### Springfield to St. Albans

Currently, AMTRAK operates the once per day Vermonter service between Washington, D.C. and St. Albans, Vermont. Service is expected to remain consistent on the Vermonter through 2035. Additionally, the infrequent Green Mountain Railroad tourist train operates along the Corridor in Vermont; service is not traditional intercity passenger rail and no indication exists that it will increase in frequency.

#### St. Albans to Montreal

The Corridor has no existing passenger service between Lacolle, Quebec and St. Albans, Vermont and no current plans call for passenger rail operation by 2035.

Between Lacolle and Montreal AMTRAK's Adirondack line operates one daily train. Currently, no plans exist to increase AMTRAK service. Additionally, VIA Rail operates intercity passenger service for a short segment from Montreal (Central Station) to St. Lambert, Quebec. Since 2009, the Government of Canada has invested significantly on the corridor between Montreal, Ottawa, and Toronto to improve speed, service, and frequency; additional train service could impact service for the last segment of the Corridor leading to Montreal and platform capacity at Central Station in 2035.

#### Springfield to New Haven

AMTRAK currently operates the once daily Vermonter and Northeast Regional between Springfield and New Haven, with continuing service to Washington, D.C and north to points in Vermont. The New Haven to Springfield Shuttle also offers connecting service to AMTRAK's Acela and Northeast Regional trains in New Haven. Intercity rail will remain unchanged on the Corridor in 2035; however, with the arrival of the NHHS Commuter Rail, passengers on the Corridor will have more frequent access to intercity rail connections in New Haven.

## 6 CORRIDOR ENVIRONMENTAL CONSTRAINTS

This section includes a description of known environmental conditions that may constrain or impact the feasibility of Study alternatives. This will include summary descriptions and mapping of resources in the Corridor.

### 6.1 LAND USE

Existing land use conditions along the study area corridor segments were characterized using a single, consistent source, the 2006 National Land Cover Database (NLCD) set. The National Land Cover Database set was created through a cooperative project conducted by the Multi-Resolution Land Characteristics (MRLC) Consortium. The MRLC Consortium is a partnership of federal agencies consisting of the U.S. Geological Survey (USGS), the National Oceanic and Atmospheric Administration (NOAA), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), the U.S. Forest Service (USFS), the National Park Service (NPS), the U.S. Fish and Wildlife Service (FWS), the Bureau of Land Management (BLM) and the USDA Natural Resources Conservation Service (NRCS).

Unlike local, regional, and state land use mapping, which varies among entities by land use type and specificity, the NLCD is based upon general use, intensity, and cover type. The applicable NLCD classifications reported for the study area are:

- **Barren Land.** Barren areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.
- **Cultivated Crops.** Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being actively tilled.
- **Deciduous Forest.** Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change.
- **Developed, High Intensity.** Includes highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses, and commercial/industrial. Impervious surfaces account for 80 -100 percent of the total cover.
- **Developed, Low Intensity.** Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-49 percent of total cover. These areas most commonly include single-family housing units.





- **Developed, Medium Intensity.** Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50-79 percent of the total cover. These areas most commonly include single-family housing units.
- **Developed, Open Space.** Includes areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20 percent of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
- **Emergent Herbaceous Wetlands.** Areas where forest or shrubland vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
- **Evergreen Forest.** Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.
- **Grassland/Herbaceous.** Areas dominated by grammanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.
- **Mixed Forest.** Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75 percent of total tree cover.
- **Open Water.** All areas of open water, generally with less than 25% cover of vegetation or soil.
- **Pasture/Hay.** Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation.
- **Shrub/Scrub.** Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.
- **Woody Wetlands.** Areas where forest or shrubland vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

Data for the Canadian portion of the Springfield-to-Montreal segment was obtained from “Land Cover, circa 2000-Vector, Centre for Topographic Information, Earth Sciences Sector, Natural Resources Canada” (Her Majesty the Queen in Rights of Canada, Department of Natural Resources), and converted to match the NLCD classifications. Maps of land use in the corridor are found in Map A.3.

These land use classifications were compiled for areas within one-half mile of each of the three route segments. The following identifies the land use constraints, by segment, for any construction or new land use outside the existing right-of-way.

### Boston to Springfield

This is a highly developed area, with development accounting for nearly 50 percent of the land area within one-half mile of the corridor. These heavily concentrated population centers could pose constraints for any construction outside the existing right-of-way. In addition, approximately one-third of the classified land use within the corridor segment exhibits a combination of deciduous forest and woody wetlands. These resource areas can also pose constraints for permitting and construction activities. Table 6.1 summarizes the land use by acreage and percentage in the Springfield-to-Boston corridor segment.

**Table 6.1: Land Use Classification and Magnitude in the Springfield-to-Boston Corridor Segment**

Segment	Land Use Classification	Acres	% of Corridor Coverage
Boston-Springfield	Barren Land	175	0.28%
Boston-Springfield	Cultivated Crops	212	0.34%
Boston-Springfield	Deciduous Forest	14,439	22.98%
Boston-Springfield	Developed, High Intensity	5,395	8.59%
Boston-Springfield	Developed, Low Intensity	8,656	13.78%
Boston-Springfield	Developed, Medium Intensity	10,213	16.25%
Boston-Springfield	Developed, Open Space	7,050	11.22%
Boston-Springfield	Emergent Herbaceous Wetland	560	0.89%
Boston-Springfield	Evergreen Forest	2,233	3.55%
Boston-Springfield	Grassland	112	0.18%
Boston-Springfield	Mixed Forest	2,127	3.39%
Boston-Springfield	Open Water	2,712	4.32%
Boston-Springfield	Pasture	2,129	3.39%
Boston-Springfield	Shrub/Scrub	605	0.96%
Boston-Springfield	Woody Wetland	6,215	9.89%

### Springfield to Montreal

This is the most rural and least developed of the three route segments with development accounting for less than 25 percent of the land area within one-half a mile of the corridor segment. It is dominated by forest, pasture, and cropland, along with wetlands and water bodies. These wet and woody areas, along with croplands and other resource areas could pose constraints to the development of some alternatives. Table 6.2 summarizes the land use by acreage and percentage in the Springfield-to-Montreal corridor segment.

**Table 6.2: Land Use Classification and Magnitude in the Springfield-to-Montreal Corridor Segment**

Segment	Land Use Classification	Acres	% of Corridor Coverage
Springfield-Montreal	Barren Land	1,173	0.84%
Springfield-Montreal	Cultivated Crops	13,223	12.63%
Springfield-Montreal	Deciduous Forest	25,773	13.55%
Springfield-Montreal	Developed, High Intensity	2,572	1.30%
Springfield-Montreal	Developed, Low Intensity	13,671	6.93%
Springfield-Montreal	Developed, Medium Intensity	9,409	9.69%
Springfield-Montreal	Developed, Open Space	12,212	6.19%
Springfield-Montreal	Emergent Herbaceous Wetland	1,243	0.65%
Springfield-Montreal	Evergreen Forest	23,848	12.12%
Springfield-Montreal	Grassland	669	0.76%
Springfield-Montreal	Mixed Forest	20,493	10.48%
Springfield-Montreal	Open Water	11,304	6.38%
Springfield-Montreal	Pasture	16,166	11.63%
Springfield-Montreal	Shrub/Scrub	3,760	1.91%
Springfield-Montreal	Woody Wetland	9,511	4.93%

### Springfield to New Haven

This is the most highly-developed segment of the project area; developed areas in this segment account for over two-thirds of the land area within one-half mile of the corridor segment. These heavily concentrated population centers could pose constraints for any construction outside the existing right-of-way. In addition, forests, wetlands and open waters, comprising more than 25 percent of the land area within one-half mile of the corridor segment, pose additional constraints to construction or new land uses within this corridor segment. Table 6.3 summarizes land use by acreage and percentage in the Springfield-to-New Haven corridor segment.

**Table 6.3: Land Use by Acres and Percentage in the Springfield-to-New Haven Corridor Segment**

Segment	Land Use Classification	Acres	% of Corridor Coverage
Springfield-New Haven	Barren Land	35	0.09%
Springfield-New Haven	Cultivated Crops	257	0.65%
Springfield-New Haven	Deciduous Forest	4,832	12.21%
Springfield-New Haven	Developed, High Intensity	3,264	8.25%
Springfield-New Haven	Developed, Low Intensity	8,276	20.91%
Springfield-New Haven	Developed, Medium Intensity	9,904	25.03%
Springfield-New Haven	Developed, Open Space	5,545	14.01%
Springfield-New Haven	Emergent Herbaceous Wetland	754	1.90%
Springfield-New Haven	Evergreen Forest	693	1.75%
Springfield-New Haven	Grassland	32	0.08%
Springfield-New Haven	Mixed Forest	174	0.44%
Springfield-New Haven	Open Water	2,988	7.55%
Springfield-New Haven	Pasture	768	1.94%
Springfield-New Haven	Shrub/Scrub	384	0.97%
Springfield-New Haven	Woody Wetland	1,666	4.21%

## 6.2 ENVIRONMENTAL JUSTICE COMMUNITIES

The concept of environmental justice is defined to ensure that federal transportation funds are used in a manner that does not adversely impact minority and low income populations and to ensure that minority and low income populations are included in the planning and decision making processes for public transportation services and projects. Environmental justice populations are defined by various thresholds at the federal, state, regional, and local level based on demographic and socioeconomic statistics. Federal Transit Administration (FTA) 2012 guidance further describes the objectives of environmental justice program as follows:

- Ensure that the level and quality of public transportation service is provided in a nondiscriminatory manner.
- Promote full and fair participation in public transportation decision-making without regard to race, color, or national origin.

- Ensure meaningful access to transit-related programs and activities by persons with limited English proficiency.<sup>37</sup>

Following the initial legislation addressing Environmental Justice, the U.S. Department of Transportation (USDOT) in 1997 released DOT Order 5610.2 entitled “Order to Address Environmental Justice in Minority Populations and Low-Income Populations.”<sup>38</sup> In 2012, USDOT issued an update to the 1997 DOT Order 5610.2<sup>39</sup> to reaffirm USDOT’s commitment to environmental justice and clarify aspects of the original Order. The USDOT guiding environmental justice principles are summarized as follows:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.<sup>40</sup>

For this study, federal thresholds of minority and low income populations were used to identify and quantify environmental justice populations within the study area. Census block groups with at least 50% minorities or 50% or more residents living below the poverty level are identified as areas with potential environmental justice populations. In order to account for regional variation in economic intensity, a regional indicator was also utilized. Thus, block groups with percentages of minorities or low income populations higher than 10% above the county average in which the block group is located are also identified as potential environmental justice populations. In the few cases where the county average was more than 50% minorities or low income, the 50% threshold was used.

Until more detailed engineering plans are available for any specific alternative, it is not possible to determine if there will be any significant impacts on EJ communities. Until that time, it will be important to continue to:

- Ensure that the level and quality of public transportation service will continue to be provided in a nondiscriminatory manner, no matter which alternative is progressed.

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<sup>37</sup> Federal Transit Administration. Circular 4702.1B: Title VI Requirements and Guidelines for Federal Transit Administration Recipients, October 2012. [Title VI Requirements and Guidelines for Federal Transit Administration Recipients](#)

<sup>38</sup> US Department of Transportation. USDOT Order on Environmental Justice, 1997. [US Department of Transportation Order on Environmental Justice](#)

<sup>39</sup> US Department of Transportation. DOT Order 5610.2(a): Final DOT Environmental Justice Order, 2012. [Department of Transportation Updated Environmental Justice Order 5610.2\(a\)](#)

<sup>40</sup> FHWA. Department of Transportation Environmental Justice Strategy, 2012. Department of Transportation Environmental Justice Strategy

- Promote full and fair participation in public transportation decision-making without regard to race, color, or national origin.
- Ensure meaningful access to transit-related programs and activities by persons with limited English proficiency.

The following identifies the demographics, economics, and environmental justice (EJ) characteristics that need to be considered in determining whether or not there will be any significant impacts on any particular EJ community.

### **Boston to Springfield**

The Boston to Springfield segment includes the Boston, Worcester, and Springfield metropolitan areas. The discussion on Springfield's social and economic resources is split between the three sections as it is common to all three study corridors.

#### Population and Population Distribution

The population in the segment between Boston and Springfield is estimated to be 1,042,505 from 2011 Census block groups. Map A.6, found in the Appendix, is a map of population density in the region and it highlights the concentration of population in the metropolitan areas along the study corridor.

#### Demographics

Within the Boston to Springfield corridor, there are 41,124 households, which represent 22% of all households in the study area. The minority population in this segment comprises 38% of the total population, which is the same as the study area as a whole. Table 6.4 describes the demographic characteristics of this segment.

**Table 6.4: Demographic Characteristics within Boston-to-Springfield Segment**

Demographic Characteristic	Count	%
Total Population	1,042,505	-
Total Households	419,124	-
Minority Population	393,524	37.7%

#### Economics

The Boston to Springfield corridor has employment of 534,848, which is one quarter of the employed population in the entire study area. The unemployment rate in this segment is approximately 8%, less than the study area average. Median household income in this segment is \$64,557, which is higher than the study area average. This segment also has a lower percentage of population living below the poverty level than the study area average. Table 6.5 provides detailed economic characteristics of the segment.



**Table 6.5: Socioeconomic Characteristics of the Boston-to-Springfield Segment**

Socioeconomic Characteristic	Count	%
Population Living Below Poverty Level	171,481	17.6%
Median Household Income	\$64,557	
Households without Vehicles Available	112,569	26.9%
Employed Population	534,848	61.5%
Unemployment	47,601	08.2%

### Environmental Justice

Potential environmental justice populations are identified by block group by minority status and household income. Table 6.6 shows that within the Boston to Springfield corridor, 42% of block groups have higher than average concentrations of minorities and 28% have higher than average concentrations of low income populations. Map A.6, found in the Appendix, is a map of block groups with environmental justice populations for the segment.

**Table 6.6: Environmental Justice Populations within the Boston to Springfield Corridor**

Environmental Justice Characteristic	Block Groups	%
Study Area	846	
Minority	357	42.2%
Low Income	237	28.0%

### **Springfield to Montreal**

The Springfield to Montreal corridor includes the Springfield, Burlington, and Montreal metropolitan areas. The discussion on Springfield's social and economic resources is split between the three sections as it is common to all three segments.

### Population and Population Distribution

The population in this segment is estimated to be 2,576,936, which includes a large portion of Montreal. Map A.5, found in the Appendix, shows the concentration of population along the Springfield to Montreal segment.

### Demographics

The Springfield to Montreal segment has the lowest percentage of minority population of the three segments at 35%. Details on the demographic characteristics of the segment are provided in Table 6.7.

**Table 6.7: Socioeconomic Characteristics of Springfield to Montreal Segment**

Demographic Characteristic	Count	%
Total Population	2,576,936	-
Total Households	1,150,842	-
Minority Population	909,544	35.3%

### Economics

Along the Springfield to Montreal segment of the study corridor, the percentage of residents living below the poverty level as defined by American and Canadian thresholds is the highest of the three segments. Only information on American households without vehicles is presented because Canadian data on that topic is not available. In Urban Areas with substantial transit options, the absence of an automobile does not in itself signify any economic condition. However in areas with limited transit options, a characteristic of this segment, the absence of a vehicle is an indicator of poverty. Slightly less than 10% of the American households within this segment do not have a vehicle available. Table 6.8 describes the socioeconomic characteristics of this segment.

**Table 6.8: Socioeconomic Characteristics of Springfield to Montreal Segment\***

Socioeconomic Characteristic	Count	%
Population Living Below Poverty Level	554,321	22.0%
Median Household Income	\$53,921	-
Households without Vehicles Available	17,785	9.5% <sup>a</sup>
Employed Population	1,240,882	58.4%
Unemployment	121,845	8.9%

*\*No data on vehicles by household for Canadian subdivisions*

### Environmental Justice

Within the Springfield to Montreal segment, very few block groups were identified as having potential environmental justice populations (Table 6.9). The majority of the block groups with potential environmental justice populations are in Massachusetts, and more specifically in Springfield, Holyoke, and Northampton. However within the cities of Montreal and Brossseau in Quebec; Canada, Brattleboro, VT; Greenfield, Northampton, Holyoke and Springfield, MA, there may be some individual Census Block Groups that have higher levels of minority, poverty or Persons with Limited English proficiency. Map A.6 is a map of block groups with environmental justice populations for the segment.

**Table 6.9: Environmental Justice Characteristics of the Springfield to Montreal Segment**

Environmental Justice Characteristic	Block Groups	%
Study Area	363	-
Minority	63	17.4%
Low Income	60	16.5%

### Springfield to New Haven

The Springfield to New Haven corridor includes the New Haven, Hartford, and Springfield metropolitan areas. The discussion on Springfield's social and economic resources is split between the three sections as it is common to all three study corridors.

#### Population and Population Distribution

The population in the segment between Springfield and New Haven is estimated to be 770,572 from 2011 Census block groups, which is approximately 18% of the entire study area population. Map A.5, found in the Appendix, is a map of population density in the region and it highlights the concentration of population in the metropolitan areas along the study corridor.

#### Demographics

Along the New Haven to Springfield segment of the study area, nearly half of the population is minorities, the highest percentage in the study area. Table 6.10 describes the demographic characteristics of the segment.

**Table 6.10: Demographic Characteristics of Springfield to New Haven Segments**

Demographic Characteristic	Count	%
Total Population	770,572	-
Total Households	293,294	-
Minority Population	373,322	48.4%

#### Economics

The Springfield to New Haven segment has the lowest median household income of the three segments, as well as the highest unemployment rate. Table 6.11 describes the socioeconomic characteristics of the Springfield to New Haven segment.

**Table 6.11: Socioeconomic Characteristics of the Springfield to New Haven Corridor Segment**

Socioeconomic Characteristic	Count	%
Population Living Below Poverty Level	131,948	18.0%
Median Household Income	\$50,804	
Households without Vehicles Available	49,872	17.0%
Employed Population	359,086	58.6%
Unemployment	46,736	11.5%

### Environmental Justice

The Springfield to New Haven segment has the highest percentages of census block groups that are home to potential environmental justice populations in the study area. More than half of the block groups in the study area are comprised of large percentages of minority populations. Table 6.12 details the potential environmental justice populations by block group for the Springfield to New Haven segment. Map A.6, found in the Appendix, is a map of block groups with environmental justice populations for the segment. When analyzing the alternatives, it will be important to ensure that there will not be any disproportionate adverse impacts on the EJ communities that reside in this corridor segment. It will also be important to ensure that these communities and neighborhoods have ample opportunities to participate in the decision-making process, and that persons with limited English proficiency have access to all materials and information regarding the proposed alternatives.

**Table 6.12: Environmental Justice Characteristics of the Springfield to New Haven Corridor Segment**

Environmental Justice Characteristic	Block Groups	%
Study Area	607	
Minority	320	52.7%
Low Income	212	34.9%

## **6.3 WATER RESOURCES**

In the United States, water resources are regulated by the EPA and the U.S. Army Corps of Engineers (USACE) according to the Water Pollution Control Act of 1972 (Clean Water Act) and the Water Quality Act of 1987. Section 404 of the Clean Water Act regulates activities affecting waters in the United States, including navigable waters, waters that are used for interstate and foreign commerce, and waters that, if impacted, could affect these activities. Regulated water bodies include surface waters such as streams, lakes and bays and their associated wetlands (i.e. saturated areas that support vegetation).

The EPA, USACE, and state agencies all issue permits for various activities in, under and over waters of the United States. In Canada, waterbodies are regulated by Environment Canada according to the 1987 Federal Water Policy. Applicable regulations pertaining to specific types of water resources within the rail corridor are presented in this section. Water resources within the proposed rail corridor were identified based on a review of a combination of GIS databases and published lists maintained by federal and state agencies. Many of these water resources could pose significant constraints to new construction outside the existing right-of-way.

### Surface Water and Ground Water Resources

There are 23 major drainage basins within the rail corridor, summarized in Tables 6.13, 6.14, and 6.15. Locations of these basins are shown in Map A.9, found in the Appendix. Publically available data for all basins within the study area were evaluated to assess public drinking water resource watersheds and community groundwater and surface wells.

Sole source aquifers, defined by EPA as those that supply at least 50% of the drinking water supply for the area, were included in the assessment of existing conditions. Public drinking water supplies and source areas are regulated by the Safe Drinking Water Act (SDWA). Public water resources were compiled for areas within one-half mile of each of the three route segments and three miles of key rail stations, and are summarized by segment, below. The protection of these resources during construction or project related activities could create constraints for alternatives that include potential impacts.

#### Boston to Springfield

There are seven major drainage basins located within the Boston to Springfield segment of the study corridor, as depicted on Table 6.13 and shown in Map A.9, found in the Appendix. No sole source aquifers as designated by the EPA were identified within the Boston to Springfield segment of the corridor, however there are groundwater and surface water supply protection areas and public surface water and groundwater wells within this segment (Map A.9). Coordination with the appropriate agencies should occur at the earliest possible opportunity to avoid any potential impacts and to include mitigation measures wherever possible.

**Table 6.13: Drainage Basins within the Boston to Springfield Corridor Segment**

Drainage Basin	Miles
Blackstone	15.7
Charles	16.9
Chicopee	35.9
Concord	19.4
Lower Connecticut	1.2
Middle Connecticut	2.7
Quinebaug	7.0



11,000 miles have been protected nationwide. Rivers are classified as wild, scenic, or recreational based on the following criteria:

- Wild river areas — Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted.
- Scenic river areas — Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
- Recreational river areas — Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Each river designated into the national system receives permanent protection from federally licensed or assisted dams, diversions, channelization and other water projects that would have a direct and adverse effect on its free-flowing condition and special resources. The Wild and Scenic Rivers Act explicitly prohibits any new dam or other project licensed by the Federal Energy Regulatory Commission (FERC) on or directly affecting a designated river segment, and requires that all other proposed federally assisted water resource development projects in the area be evaluated by the managing agency for their potential impacts on the river's "outstandingly remarkable" values and free-flowing condition. Any federally licensed or initiated project that would result in adverse effects to the designated segment is precluded under the Act. Federal status of the rivers in each of the three route segments was evaluated and results are summarized below.

#### Boston to Springfield

Federally listed Wild and Scenic Rivers located in the rail Corridor include portions of the Sudbury and Assabet rivers in Massachusetts. The proposed Corridor crosses this segment in the upper reaches of the SuAsCo watershed. This could pose a significant constraint to any alternative that includes potential impacts to this resource.

#### Springfield to Montreal

There are no federally listed Wild and Scenic Rivers located in the Springfield to Montreal segment of the rail corridor.

#### Springfield to New Haven

There are no federally listed Wild and Scenic Rivers located in the Springfield to New Haven segment of the rail corridor.

### **Floodplains**

A national policy for protection of floodplains is provided under Executive Order 11988, Floodplain Management (May 24, 1977). As part of the National Flood Insurance Program, the Federal Emergency Management Agency (FEMA) is responsible for the delineation of areas prone to flooding. These flood-prone areas are most often delineated based upon the



100-year storm event. This is the storm event predicted to occur once every 100 years, and which has a 1% chance of occurring in any given year. The floodway is the channel of the stream and any other adjacent floodplain areas that must be kept free of encroachment in order that the 100-year flood is carried without any increase in the flood height.

Floodplain limits within the project area were determined from FEMA Flood Insurance Rate Map (FIRM) data bases. As would be expected, areas subject to flooding within the project area generally coincide with rivers, streams, wetlands, and nearby low-lying valley areas.

### **Wetlands**

Wetland resources include an extremely diverse array of natural areas. They encompass a continuum ranging from sites which may only have seasonally high water tables, to swamps, marshes, and wetland meadows which are seasonally flooded, periodically inundated, or saturated throughout the year; from a regulatory perspective they also includes lakes, ponds, rivers, and other water bodies which are permanently underwater. Wetlands are typically defined using multiple-parameter criteria based on hydrology (e.g., water above, at, or near the soil surface for at least portions of the year), vegetation (species adapted to flooding or saturated soil conditions), and soils that develop anaerobic conditions for at least some of the year.

Executive Order 11990 established the protection of wetlands as a national policy in May 24, 1977. At the federal level, Section 404 of the U.S. Clean Water Act is the primary wetlands protection program. Section 404 regulates the discharge of dredged or fill material into all waters of the United States, including wetlands. Section 404 protects a suite of functions provided by wetlands and waters, including wildlife habitat, flood-flow alteration, water quality and nutrient processing, groundwater interchange, and fish/shellfish habitat. State regulation of impacts to wetlands/waters is focused on protection of similar functions, although there are some differences in the definitions of wetlands between states. For example, Connecticut's definition of wetlands focuses on soil types, while Massachusetts establishes specific definitions for different types of wetland resource areas; Vermont and New Hampshire wetland definitions tend to be consistent with the federal definitions as implemented under Section 404.

The extent of wetlands along the project corridor has been depicted using information from the U.S. Fish and Wildlife Service's (USFWS) National Wetland Inventory (NWI), as well as the USGS National Hydrography Dataset. NWI mapping classifies wetlands into five major systems: Marine, Estuarine, Riverine, Lacustrine, and Palustrine, and then further distinguishes wetland types within these systems by subsystem, class, and subclass based upon various criteria such as type of vegetative cover. Marine and Estuarine wetlands and waters are limited to tidal areas in the vicinity of Boston and New Haven. The Riverine system encompasses all fresh water rivers and their tributaries. Lacustrine wetlands include lakes that are greater than 20 acres in area and more than 6.6 feet in depth. Palustrine wetlands are non-tidal freshwater wetlands dominated by trees, shrubs, and persistent emergent herbaceous plants. Freshwater ponds less than 20 acres fall within the Palustrine system.

Map A.9, found in the Appendix, depicts the mapped wetlands as well as lakes, ponds, rivers and designated floodplain areas within the rail corridor segments. Floodplains and wetlands can pose significant constraints to the development of alternatives. Information on the nature and extent of floodplains and wetlands within each segment is provided in the following sections.

### Boston to Springfield

#### **Floodplains**

FEMA-designated floodplains comprise approximately 9,012 acres in the Boston to Springfield segment of the rail corridor. Major river floodplains along this segment include the Charles, Sudbury, Quaboag, Chicopee, and the Connecticut Rivers. Floodplains also are mapped along numerous smaller tributaries and larger lakes along the corridor.

#### **Wetlands**

NWI-mapped wetlands comprise approximately 7,760 acres in the Boston to Springfield segment of the rail corridor (Table 6.16). Freshwater (Palustrine) forested and shrub wetlands are the most abundant wetland type mapped in this segment, with lakes (Lacustrine) and freshwater emergent wetlands also relatively prevalent.

**Table 6.16: NWI-Mapped Wetland Types, Boston to Springfield Segment**

Wetland Type	Number of Occurrences	Acreage
Estuarine and Marine Deepwater	8	13.1
Estuarine and Marine Wetland	1	0.1
Freshwater Emergent Wetland	534	1711.8
Freshwater Forested/Shrub Wetland	1078	2676.8
Freshwater Pond	231	428.4
Lake	47	2148.0
Riverine	43	782.5

Regionally significant wetlands occur in the headwaters region of the Sudbury River (Cedar Swamp) and along the Quaboag River valley.

### Springfield to Montreal

#### **Flood plains**

FEMA-designated floodplains comprise approximately 25,036 acres in the Springfield to Montreal segment of the rail corridor. Major river floodplains along this segment include the Connecticut River, Deerfield River, West River, White River (and its branches), Dog River, Winooski River, and Lamoille River in the United States, and the Richelieu River in Canada. Floodplains also are mapped along numerous smaller tributaries and larger lakes along the corridor.

**Wetlands**

NWI-mapped wetlands comprise approximately 19,175 acres in the Springfield to Montreal segment of the rail corridor (Table 6.17). Riverine and Freshwater (Palustrine) forested and shrub wetlands are the most abundant wetland type mapped in this segment. The presence of the Connecticut River, White River (and its branches), Winooski River, and the Richelieu River along much of the corridor contributes substantially to the extensive area of Riverine wetland.

**Table 6.17: NWI-Mapped Wetland Types, Springfield to Montreal Segment (U.S. Portion Only)**

Wetland Type	Number of Occurrences	Acreage
Estuarine and Marine Deepwater	0	0
Estuarine and Marine Wetland	0	0
Freshwater Emergent Wetland	586	1816.0
Freshwater Forested/Shrub Wetland	1014	6015.4
Freshwater Pond	342	445.4
Lake	43	2806.2
Riverine	121	8081.2

There are a number of regionally significant wetlands and/or aquatic systems along the segment, many associated with the Connecticut River, White River (and its branches) and the Lake Champlain area waterways, as indicated Wetland and aquatic resources form the foundation of two national wildlife refuges along the corridor: Silvio Conte and Missisquoi National Wildlife Refuges.

**Springfield to New Haven****Flood plains**

FEMA-designated floodplains comprise approximately 10,252 acres in the Springfield to New Haven segment of the rail corridor. Major river floodplains along this segment include the Quinnipiac River (including the coastal flood zone of New Haven), Mattabesset River, Piper Brook, Farmington River, and the Connecticut River. Floodplains also are mapped along numerous smaller tributaries and larger lakes along the corridor.

**Wetlands**

NWI-mapped wetlands comprise approximately 6,051 acres in the Springfield to New Haven segment of the rail corridor (Table 6.18). Riverine and Freshwater (Palustrine) forested and shrub wetlands are the most abundant wetland type mapped in this segment. The presence of the Connecticut River along much of the corridor contributes substantially to the extensive area of Riverine wetland.



**Table 6.18: NWI-Mapped Wetland Types, Springfield to New Haven Segment**

Wetland Type	Number of Occurrences	Acreage
Estuarine and Marine Deepwater	5	190.2
Estuarine and Marine Wetland	20	418.5
Freshwater Emergent Wetland	191	521.1
Freshwater Forested/Shrub Wetland	372	1932.7
Freshwater Pond	180	249.2
Lake	5	232.2
Riverine	26	2506.9

Regionally significant wetlands occur along the Quinnipiac River, around the confluence of the Farmington and Connecticut Rivers, and in the Connecticut River floodplain along Longmeadow and Raspberry Brooks in Longmeadow, MA.

## **6.4 CULTURAL RESOURCES**

### **Natural Habitats and Wildlife**

The rail corridor extends through varied terrain with diverse vegetated cover types and land uses, ranging from urban centers, suburban developments, rural residential and agricultural lands, to relatively undeveloped wetland and forested habitat in some of the more remote sections. From an ecological perspective, each of these land cover types provides an opportunity to support a distinct suite of wildlife species. To provide an understanding of the specific vegetated cover types and their relative extent along the rail corridor, data layers from National Land Cover Data Set (2006) were employed and data extracted to reflect the relative area of each cover type. Included in these cover types are deciduous forest, evergreen forest, mixed forest, woody wetland, shrub/scrub, grassland, pasture, cultivated crops, barren land, and emergent herbaceous wetland.

These cover types are a primary factor in determining wildlife utilization, however other factors such as the size of the various habitat areas, connectivity/fragmentation, surrounding land uses, and land use history all affect habitat suitability. Accordingly, these factors were incorporated into the general assessment of the wildlife species that could potentially occur along the various segments of the rail corridor.

An additional factor to be considered in this assessment is the potential habitat along the rail corridor for threatened and endangered species, both at federal and state levels. At the federal level, the U.S. Endangered Species Act of 1973 (Public Law 93-205) provides protection for a relatively small set of wildlife (plants and animals) because of their declining or low populations and/or special habitat requirements. This Act protects species that are either:

- **Endangered** - Any species which is in danger of extinction throughout all or a significant portion of its range (excepting certain insect pests); or
- **Threatened** - Any species which is likely to become endangered within the foreseeable future throughout all or a significant part of its range.

Federally-listed species within the New England states that encompass the U.S. portions of the rail corridor range from 10-14 ([Endangered Species Consultation](#)). None of the listed species in Connecticut are known to occur in towns or habitats encompassed by the rail corridor. In Massachusetts there is some overlap of the rail corridor with towns and/or habitats that could support the dwarf wedgemussel (in the Connecticut River), the small whorled pogonia, and the Puritan tiger beetle. In Vermont and New Hampshire, there is some overlap of the rail corridor with towns and/or habitats that could support the Indiana bat, Canada lynx, dwarf wedgemussel, northeast bulrush, Jesup's milkvetch, and small whorled pogonia.

In Canada, the Species at Risk Act (SARA) establishes Schedule 1 as the official list of wildlife species at risk. It classifies those species as being either extirpated, endangered, threatened, or a special concern. Once listed, the measures to protect and recover a listed wildlife species are implemented. SARA also establishes Schedules 2 and 3 listings of Canadian species by the Scientific Committee on the Status of Endangered Wildlife in Canada (COSEWIC); collectively, species are classified as being extinct, extirpated, endangered, threatened and vulnerable.

Individual states have also generated state-specific listings of "rare" flora and fauna under the Natural Heritage/Natural Diversity Programs. These lists are much more expansive than the federal listing. For example, Massachusetts lists 432 species in their state-listing, while only 24 are federally-listed. The state listings generally include the following categories, with definitions and specific legal status and regulatory protection varying to some degree among the various states:

- **Special Concern Species** - Any species documented to have suffered a decline that could threaten the species if allowed to continue unchecked, or that occurs in such small numbers or with such a restricted distribution or specialized habitat requirements that it could easily become threatened.
- **Threatened Species** - Any species likely to become endangered within the foreseeable future throughout all or a significant part of its range and any species documented to be declining or rare and likely to become endangered in the foreseeable future.
- **Endangered Species** - Any species in danger of extinction or extirpation throughout all or a significant portion of its range.

For the purposes of this assessment, designated state-listed species habitats were plotted within the rail corridor to indicate areas that each individual state has delineated as habitat for Special Concern, Threatened, or Endangered Species using state-specific criteria. Such delineations would also encompass any areas potentially used by any federally-listed species, although specific records of any such occurrences have not been identified for this assessment.

Overall, significant ecological areas within the corridor are noted along various portions of the rail segments. Many of these are associated with river valleys and associated wetlands and floodplains, along which the rail lines have been developed due to the flat terrain in these areas. Map A.9 provides guidance on portions of the corridor that offer notable habitat features, indicated by the prominent wetland/aquatic habitats and areas mapped for state-listed species habitats. Specific areas noted within each segment are described below.

Increasing concern has been developing in recent years over the presence and expansion of plant invasive species, due to their potential for out-competing native vegetation and adversely affecting the suitability of habitats to support native wildlife species.

Transportation corridors such as railways are prone to invasive species proliferation and expansion due to disturbance factors and ease of distribution. Invasive species of note in the northeast region that may be prone to occur along railways include common reed (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*), Japanese knotweed (*Polygonum cuspidatum*), autumn olive (*Elaeagnus umbellata*), multiflora rose (*Rosa multiflora*), and several species of honeysuckle (*Lonicera* spp.). No specific documentation or mapping of such species presence is available for review on the scale of this assessment.

### Boston to Springfield

#### **Habitats**

The extent of habitat cover types within the Boston to Springfield segment are indicated on Table 6.19. The most abundant habitats include deciduous, evergreen, mixed, and wetland forests. Forested habitats are dispersed along this rail segment between the urban centers of Boston, Worcester, and Springfield, and include numerous small forest stands in suburban areas. Collectively, these forest cover types comprise approximately 40% of the rail corridor between Boston and Springfield. Notable habitat blocks in this rail segment include those along major rivers such as the Charles, Sudbury, Quaboag, and Chicopee Rivers. Roughly 50% of the corridor is classified as developed land uses.

**Table 6.19: Extent of Habitat Cover Types in the Boston to Springfield Segment**

Habitat Cover Type	Number of Occurrences	Acreage	Percent of Rail Corridor
Barren Land	56	175.4	0.3
Cultivated Crops	63	211.6	0.3
Deciduous Forest	2437	14439.2	23.0
Emergent Wetland	290	559.9	0.9
Evergreen Forest	955	2233.3	3.6
Grassland	38	112.1	0.2
Mixed Forest	1076	2127.0	3.4
Open Water	249	2711.7	4.3
Pasture	490	2129.1	3.4



Habitat Cover Type	Number of Occurrences	Acreage	Percent of Rail Corridor
Shrub/Scrub	464	605.4	1.0
Woody Wetland	1224	6214.8	9.9

## Wildlife

Based upon the habitat cover types and considering the regional landscape factors that influence habitat suitability and wildlife use, a wide variety of wildlife species are expected to occur along the rail corridor. Table 6.20 provides a listing of common reptiles, amphibians, birds, and mammals that are likely to occur along the Boston to Springfield segment of the rail corridor.

**Table 6.20. Common Wildlife Species Likely to Occur in Habitats along the Rail Corridor**

Species Type	Common Name	Scientific Name
Amphibian	Redback salamander	<i>Plethodon cinereus</i>
Amphibian	Eastern American toad	<i>Bufo a. americanus</i>
Amphibian	Green frog	<i>Rana clamitans melanota</i>
Amphibian	Pickerel frog	<i>Rana palustris</i>
Amphibian	Bull frog	<i>Rana catesbeiana</i>
Reptile	Eastern garter snake	<i>Thamnophis s. sirtalis</i>
Reptile	Painted Turtle	<i>Chrysemys picta</i>
Reptile	Snapping Turtle	<i>Chelydra serpentina</i>
Bird	Turkey vulture	<i>Cathartes aura</i>
Bird	Broad-winged hawk	<i>Buteo platypterus</i>
Bird	Red-tailed hawk	<i>Buteo jamaicensis</i>
Bird	Wild turkey	<i>Meleagris gallopavo</i>
Bird	American woodcock	<i>Scolopax minor</i>
Bird	Mourning dove	<i>Zenaida macroura</i>
Bird	Downy woodpecker	<i>Picoides pubescens</i>
Bird	Hairy woodpecker	<i>Picoides villosus</i>
Bird	Northern flicker	<i>Colaptes auratus</i>
Bird	Eastern phoebe	<i>Sayornis phoebe</i>
Bird	Eastern kingbird	<i>Tyrannus tyrannus</i>
Bird	Blue jay	<i>Cyanocitta cristata</i>

Species Type	Common Name	Scientific Name
Bird	American crow	Corvus brachyrhynchos
Bird	Black-capped chickadee	Parus atricapillus
Bird	Tufted titmouse	Parus bicolor
Bird	Red-breasted nuthatch	Sitta Canadensis
Bird	White-breasted nuthatch	Sitta carolinensis
Bird	House wren	Troglodytes aedon
Bird	American robin	Turdus migratorius
Bird	Gray catbird	Dumetella carolinensis
Bird	Northern mockingbird	Mimus polyglottos
Bird	Red-eyed vireo	Vireo olivaceus
Bird	Yellow warbler	Dendroica petechia
Bird	Northern cardinal	Cardinalis cardinalis
Bird	Rose-breasted grosbeak	Pheucticus ludovicianus
Bird	Chipping sparrow	Spizella passerina
Bird	Song sparrow	Melospiza melodia
Bird	White-throated sparrow	Zonotrichia albicollis
Bird	Dark-eyed junco	Junco hyemalis
Bird	Red-winged blackbird	Agelaius phoeniceus
Bird	Purple finch	Carpodacus purpureus
Bird	House finch	Carpodacus mexicanus
Bird	American goldfinch	Carduelis tristis
Mammal	Northern short-tailed shrew	Blarina brevicauda
Mammal	Eastern mole	Scalopus aquaticus
Mammal	Star-nosed mole	Condylura cristata
Mammal	Little brown myotis	Myotis lucifugus
Mammal	Eastern cottontail	Sylvilagus floridanus
Mammal	Eastern chipmunk	Tamias striatus
Mammal	Woodchuck	Marmota monax
Mammal	Gray squirrel	Sciurus carolinensis
Mammal	Red squirrel	Tamiasciurus hudsonicus
Mammal	Southern flying squirrel	Glaucomys volans

Species Type	Common Name	Scientific Name
Mammal	White-footed mouse	<i>Peromyscus leucopus</i>
Mammal	Meadow vole	<i>Microtus pennsylvanicus</i>
Mammal	Coyote	<i>Canis latrans</i>
Mammal	Red fox	<i>Vulpes vulpes</i>
Mammal	Gray fox	<i>Urocyon cinereoargenteus</i>
Mammal	Raccoon	<i>Procyon lotor</i>
Mammal	Striped skunk	<i>Mephitis mephitis</i>
Mammal	Norway rat	<i>Rattus norvegicus</i>
Mammal	Virginia opossum	<i>Didelphis virginiana</i>
Mammal	White-tailed deer	<i>Odocoileus virginianus</i>

### Threatened and Endangered Species

Areas within the rail corridor between Boston and Springfield that are designated as habitat for state-listed species (Priority Habitat and Estimated Habitat) by the Massachusetts Natural Heritage and Endangered Species Program (MNHESP) comprise approximately 5,914 acres (9.4% of the corridor); a total of 28 discrete areas mapped as habitat for state-listed species occur within the Boston to Springfield segment of the rail corridor. Figure A-10 shows the designated limits of these habitat areas of state-listed species within this segment. Notable areas of these habitat zones include Cedar Swamp (Westborough, MA), Lake Quinsigamond area (Worcester, MA), the Quaboag River valley, and portions of the Chicopee River and adjacent floodplain. Species-specific details of these Priority and Estimated Habitat areas have not been determined for this assessment.

### Springfield to Montreal

#### **Habitat**

The extent of habitat cover types in the U.S. portion of the Springfield to Montreal segment are indicated on Table 6.21. Forested cover types comprised roughly 48% of the rail corridor. A much reduced proportion (23%) of this segment of the rail corridor consists of developed land uses than along either of the other segments.

**Table 6.21. Extent of Habitat Cover Types in the Springfield to Montreal Segment (U.S. only)**

Habitat Cover Type	Number of Occurrences	Acreage	Percent of Corridor
Barren Land	309	1173.0	0.1%
Cultivated Crops	1257	13223.1	0.6%
Deciduous Forest	6555	25773.1	12.2%
Emergent Wetland	628	1242.9	1.9%
Evergreen Forest	6730	23847.8	1.8%
Grassland	348	669.3	0.1%
Mixed Forest	7207	20493.2	0.4%
Open Water	533	11303.9	7.6%
Pasture	2412	16165.6	1.9%
Shrub/Scrub	2977	3759.9	1.0%
Woody Wetland	2395	9511.0	4.2%

## Wildlife

Wildlife species anticipated to occur within the habitats along the Springfield to Montreal segment are more diverse than those of the previous two segments due to the larger area, more varied terrain, and more rural setting. In addition to the species listed in Table 6.20, species that may occur in the northern portions of this corridor segment include those requiring larger, undisturbed tracts of land.

## Threatened and Endangered Species

Areas within the rail corridor between Springfield and Montreal that are designated as habitat for state-listed species comprise 25,384 acres, or 15.3% of the corridor. A total of 3,459 discrete areas mapped as habitat for state-listed species occur within the segment, with more than 50% of these occurrences attributed to state-listed plant species. Notable areas within the segment that are mapped as state-listed species habitats include several areas along the Connecticut River north of Springfield and north of the Vermont state line; the Connecticut River and its floodplain just north of Bellows Falls, Vermont; an extend stretch of the Connecticut River below White River Junction, Vermont; a stretch of the Third Branch White River through Randolph, Vermont; the Lamoille River at Arrowhead Mountain Lake, Vermont; the Missisquoi National Wildlife Refuge; a large peatland just north of the U.S. border in Canada to the east of the Richelieu River; and the Richelieu River.

## Springfield to New Haven

### **Habitat**

The extent of habitat cover types in the Springfield to New Haven segment are indicated on Table 6.22. Forested cover types comprised roughly 18% of the rail corridor. A much greater proportion (68%) of this segment of the rail corridor consists of developed land uses than along the other two segments.

**Table 6.22. Extent of Habitat Cover Types in the Springfield to New Haven Segment**

Habitat Cover Type	Number of Occurrences	Acreage	Percent of Rail Corridor
Barren Land	16	34.7	0.1%
Cultivated Crops	37	256.7	0.6%
Deciduous Forest	974	4831.9	12.2%
Emergent Wetland	136	753.7	1.9%
Evergreen Forest	420	693.4	1.8%
Grassland	16	31.8	0.1%
Mixed Forest	131	174.2	0.4%
Open Water	156	2987.7	7.6%
Pasture	150	768.1	1.9%
Shrub/Scrub	253	384.0	1.0%
Woody Wetland	418	1666.4	4.2%

### **Wildlife**

Based upon the habitat cover types and considering the regional landscape factors that influence habitat suitability and wildlife use, a wide variety of wildlife species are expected to occur along the rail corridor. Table X-x provides a listing of common reptiles, amphibians, birds, and mammals that are likely to occur along the Springfield to New Haven segment of the rail corridor; due to the similarities in landscape setting and habitat cover types, the listings of common wildlife species is the same for both the Boston to Springfield segment and the Springfield to New Haven segment.

### **Threatened and Endangered Species**

Areas within the rail corridor between Springfield and New Haven that are designated as habitat for state-listed species by the Connecticut Natural Diversity Data Base (in Connecticut) and by MNHESP (in Massachusetts) comprise approximately 10,298 acres (26% of the corridor); a total of 15 discrete areas mapped as habitat for state-listed species occur within the Springfield to New Haven segment of the rail corridor. Figure A-10 shows the designated limits of these habitat areas of state-listed species within this segment. Notable

areas of these habitat zones include the Quinnipiac River marshes, the Connecticut River and its floodplains at the confluence of the Farmington River, and the Connecticut River floodplain wetlands in Longmeadow, Massachusetts in the area of Longmeadow Brook and Raspberry Brook. Species-specific details for these areas have not been determined for this assessment.

#### **4(f) Resources**

In accordance with Section 4(f) of the Department of Transportation Act of 1966 (49 U.S.C. 303), every effort must be made to “preserve the natural beauty of the countryside, publicly owned parks, recreation areas, wildlife or waterfowl refuges, or any historic sites of national, state, or local significance.” As such, Section 4(f) prohibits federal transportation agencies from approving a project that uses land from a significant public park, recreation area, wildlife or waterfowl refuge, or historic site, unless the agency determines that there is no feasible and prudent avoidance alternative to the use of that property and that the proposed project includes all feasible planning to minimize harm to the property resulting from its use; or the agency determines that the use, including any measures to minimize harm, will ultimately have a minimal and insignificant adverse impact on the property. The use of a Section 4(f) property occurs when the property is permanently incorporated into the transportation project through a taking of the land; when it is temporarily occupied; or when its significant features are substantially impaired such that its value as a 4(f) resource will be meaningfully diminished or lost.

This section provides an overview of Section 4(f) properties within and immediately adjacent to the corridor, including both public parklands and above ground cultural resources. In accordance with the National Historic Preservation Act (NHPA), cultural resources may include buildings, structures, sites, objects and districts, as well as archaeological resources. Section 106 of the NHPA states that any federally funded project must “take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register.” Parklands include parks, recreation areas, and wildlife or waterfowl refuges. Although there are known archaeological resources in the corridor, it’s impossible to know at this stage whether they are 4(f) resources. Additional coordination with the State Historic Preservation Offices (SHPOs) will need to be undertaken as the project development process advances.

#### **Methodology**

For the purposes of this planning level analysis, cultural resources along the corridor were identified through the National Register of Historic Places Geographic Information System (GIS). This includes all properties within 300 feet of the center line of the corridor and the proposed station sites that are listed in the National Register of Historic Places. Additional properties that may have been determined eligible will be identified through consultation with the appropriate State Historic Preservation Offices (SHPOs).



Data on public parks, recreation areas, and wildlife and waterfowl refuges was obtained through Geographic Information System (GIS) data from the States of Connecticut, Massachusetts, New Hampshire, and Vermont.<sup>41</sup> In addition, schools data was obtained from ESRI, since some school grounds include publicly-used playgrounds and recreational fields. This data was then compiled and parks that are privately-owned or are the property of organizations or land trusts were queried out. In addition, private schools, public schools without recreational areas, and publicly-owned lands that do not serve a true recreational purpose were also removed. Where the precise nature of the recreational use is unclear, the property was included within the analysis. As the project development process advances, more detailed research and investigation of the use and ownership of these potential Section 4(f) resources will be conducted to fully determine the nature and extent of possible impacts from the project.

The analysis that follows identifies the number of 4(f) cultural and park properties by segment, concentrations of such properties, and properties that, due to their proximity to the corridor and proposed stations, may be the most likely to be affected by the improvements.

#### **4(f) Cultural Resources**

There are 139 National Register-listed buildings, sites and districts within 300 feet of the centerline of the corridor. The majority of them are concentrated in urban areas and village centers. Many properties were directly related to the operation of the railroad, such as the many train stations along the corridor. Others were developed in response to the access provided by the railroad. As such, the continuation and enhancement of the railroad functions along the Inland Corridor is consistent with their history and context.

##### **Boston to Springfield**

The segments between Boston and Worcester and Worcester and Springfield were chartered in the mid-19<sup>th</sup> century and by the 1870s were operating as the Boston and Albany Railroad. They were eventually merged into the Penn Central Railroad in the 1960s and were controlled by Amtrak after 1971.

There are 56 National Register-listed buildings, sites and districts within the study corridor in the segment between Boston and Springfield. Many of these properties are clustered in Springfield, Worcester, and Newton, Massachusetts. Of these properties, four are historic railroad stations, among them Union Station in Palmer, Union Station in Worcester, the

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<sup>41</sup> GIS layers include: Connecticut DEEP “Municipal Private Open Space,” updated 1997; Connecticut DEEP “Federal Open Space” and “DEEP Property,” extracted from CT DEEP 2013 GIS Data Layers; Massachusetts “Protected and Recreation OpenSpace,” updated 2013; New Hampshire “nhrec,” updated 2010; Vermont “Cadastral Conspub,” updated 2009; and ESRI “Schools,” updated 2012.

Framingham Railroad Station, and the Wellesley Farms Railroad Station. Three of the four, the stations in Worcester, Framingham, and Wellesley continue to function as rail depots; Union Station in Palmer is currently used as a restaurant. At this time, improvements are not anticipated at the Wellesley Farms Station. Any improvements at these stations would need to be sensitive to their historic character and context.

Historic districts that directly abut, or are bisected by, the railroad corridor are detailed in Table 6.23 below. Due to the proximity of the rail line to these districts, any improvements in their vicinity would need to be consistent with the area's historic character in order to ensure that they do not adversely impact historic 4(f) properties.

**Table 6.23. National Register Sites and Districts Directly Abutting the Springfield to Boston Corridor**

Name	Location
Downtown Springfield Railroad District	Springfield, MA
Grafton State Hospital	Grafton, MA
Sudbury Aqueduct Linear District	Sudbury, MA
Olmsted Park System	Boston, MA

#### New Haven to Springfield

This segment of the corridor passes along rail lines that date to the 1830s and 1840s as part of the Hartford and New Haven Railroad and the Hartford, Providence, and Fishkill Railroad. The Hartford to New Haven Railroad was the primary carrier in Southern New England in the middle of the 19<sup>th</sup> century. The Hartford, Providence, and Fishkill Railroad connected Hartford with New York, cutting diagonally across the state. The two lines converged at Newington and then ran parallel north to Hartford. In the latter part of the 20<sup>th</sup> century, these lines became part of the Penn Central Railroad and later Amtrak.

There are 38 National Register-listed buildings, sites and districts within the study corridor in the segment between New Haven and Springfield. The majority of the individually listed properties are historic railroad stations. Union Station in New Haven, the Wallingford Station, Hartford Union Station, the Windsor Station, and the Springfield Station are listed in the National Register and could potentially be directly impacted by the Inland Corridor project. The Berlin Station has also been determined eligible for listing in the National Register, as documented within the Environmental Assessment for high speed rail improvements along the corridor between New Haven and Springfield.

National Register-listed districts that directly abut, or are bisected by, the railroad corridor between New Haven and Springfield are detailed in Table 6.24 below. In addition to these districts obtained through the National Park Service, the 2012 Environmental Assessment prepared for high speed rail improvements in the New Haven-Hartford-Springfield Corridor

suggests that the entire rail corridor, including select bridges and culverts, may also be eligible. Improvements to the stations, or changes to the rail infrastructure within the historic districts, should be sensitive to the property's historic character to ensure that there are no adverse impacts to historic 4(f) properties.

**Table 6.24 National Register Sites and Districts Directly Abutting the New Haven to Springfield Corridor**

Name	Location
Imlay and Laurel Streets District	Hartford, CT
Newington Junction North Historic District	Newington, CT
Colony Street – West Main Street Historic District	Meriden, CT
Pines Bridge Historic District	North Haven, CT
Bigelow-Hartford Carpet Mills Historic District	Enfield, CT
Broad Street Green Historic District	Windsor, CT
J.R. Montgomery and Company Industrial Complex	Windsor Locks, CT
Enfield Canal	Enfield, CT

### Springfield to Montreal

The southern portion of this segment opened in 1845, providing service between Springfield and Northampton, and then was extended north to the Vermont state line four years later. The line was leased by the Boston and Maine Railroad late in the 19<sup>th</sup> century and served to provide a critical transportation link between Montreal and New York City.

There are 43 National Register-listed buildings, sites and districts within the study corridor in the segment between Springfield and Montreal. The majority of these are historic districts in small village centers in Vermont. Union Station in Brattleboro, Vermont is listed in the National Register and could potentially be directly impacted by the Inland Corridor project. In addition, the Boston and Maine Railroad Station, although not listed in the National Register, was designed by H.H. Richardson and is listed in the Massachusetts State Register of Historic Places.

National Register-listed districts that directly abut, or are bisected by, the railroad corridor between Springfield and Montreal are detailed in Table 6.25 below. Improvement to the Brattleboro, Vermont Station or the Boston and Maine Railroad Station in Holyoke, Massachusetts, or changes to the rail infrastructure within the historic districts, should be sensitive to the property's historic character to ensure that there are no adverse impacts to historic 4(f) properties.



**Table 6.25. National Register Sites and Districts Directly Abutting the Springfield to Montreal Corridor**

Name	Location
Old Deerfield Village Historic District	Deerfield, MA
Northampton Downtown Historic District	Northampton, MA
Westminster Village Historic District	Westminster, MA
North Hatfield Historic District	Hatfield, MA
Holyoke Canal System	Holyoke, MA
Charlestown Main Street Historic District	Charlestown, NH
West Hartford Village Historic District	Hartford, VT
Central Vermont Railroad Headquarters	Northfield, VT
Depot Square Historic District	Randolph, VT
Windsor Village Historic District	Windsor, VT
Bethel Village Historic District	Bethel, VT
South Royalton Historic District	South Royalton, VT
Waterbury Village Historic District	Waterbury, VT
White River Junction Historic District	White River Junction, VT
Gray Rocks	Richmond, VT
Terraces Historic District	Hartford, VT
McKenstry Manor	Bethel, VT

#### **4(f) Parklands, Recreation Areas, and Wildlife and Waterfowl Refuges**

Connecticut, Massachusetts, New Hampshire and Vermont have extensive recreational resources that may qualify under Section 4(f), however only a limited number lie in close proximity to the study corridor. In addition, many of those resources identified within the study corridor are separated from the rail line by buildings or roadways, while others lie a sufficient distance from the rail line as to limit any impacts. In each segment, however, there are parks and recreation areas that are immediately adjacent to the corridor, are bisected by the line, or that abut active stations. It is these recreational properties that are most likely to experience potential adverse impacts under Section 4(f).

#### **Boston to Springfield**



Within the segment of the corridor between Boston and Springfield there are 78 potential 4(f) parks, recreation areas, and wildlife and waterfowl refuges within the study corridor. Of these, 23 are immediately adjacent to the rail line, while six are bisected by it. These six properties and their locations are summarized in Table 6.26 below.

**Table 6.26 Potential Section 4(f) Parklands Bisected by the Rail Corridor within the Segment from Boston to Springfield**

Name	Location
Sudbury Reservoir	Sudbury, MA
Railroad Park	Spencer, MA
Cochituate State Park	Wellesley, MA
George H. Nichols Flood Control Site	Westborough, MA
Town Land	East Brookfield, MA
Lake Lorraine Conservation Area	Springfield, MA

## New Haven to Springfield

Within the segment of the corridor between New Haven and Springfield there are 36 potential 4(f) parks, recreation areas, and wildlife and waterfowl refuges within the study corridor. Of these, 17 are immediately adjacent to the rail line, while two, Riverfront Park in Springfield and the Town of Longmeadow Conservation Area, are bisected by it. In addition, Railroad Green Park in Wallingford abuts Wallingford Station.

## Springfield to Montreal

Within the segment of the corridor between Springfield and Montreal there are 48 potential 4(f) parks, recreation areas, and wildlife and waterfowl refuges within the study corridor. Of these, 22 are immediately adjacent to the rail line, while another three are bisected by the line. These three include the Silvio O Conte National Fish and Wildlife Refuge in Brunswick, Vermont, the Missisquoi National Wildlife Refuge in Swanton Vermont, and the White River Wildlife Management Area in Sharon, Vermont. In addition, the Nagle Downtown Walkway lies immediately adjacent to the station in Northampton, Massachusetts.

## 7 US/CANADA BORDER CROSSING ISSUES / ASSUMPTIONS

The U.S. Department of Homeland Security's (DHS) is considering establishing pre-clearance operations at Central Station in Montreal. Currently, passengers crossing from Canada to the United States on AMTRAK must be inspected at the border, which frequently takes an hour or more. DHS pre-clearance at Central Station would allow for more efficient train service between Montreal and the U.S. by allowing trains to operate from Montreal to the first American station without stopping at the border. Additionally, DHS pre-clearance would save passengers and crew time

With pre-clearance, border agents "stationed abroad screen and make admissibility decisions about passengers and their accompanying goods or baggage heading to the United States before they leave a foreign port."<sup>42</sup> DHS currently maintains pre-clearance operations in Aruba, the Bahamas, Bermuda, and Ireland and at eight Canadian airports: Calgary, Edmonton, Halifax, Montreal, Ottawa, Toronto, Vancouver, and Winnipeg.<sup>43</sup>

A special international platform at Central Station-Montreal would receive upgrades to comply with DHS guidelines according to preliminary plans under consideration by AMTRAK and AMT.<sup>44</sup> U.S. and Canadian border agents would jointly patrol the station platforms, which would be physically isolated from other platforms.<sup>45</sup> While the program has received considerable political support from the New York and Vermont Congressional delegations, the program has not advanced beyond initial planning and design stages.<sup>46</sup>

The Central Station international platforms would operate in a similar manner to isolated international platforms found in other parts of the world. For example, the United Kingdom (U.K.), France, and Belgium operate border similar pre-clearance facilities for the Eurostar trains at key stations.<sup>47</sup> Passengers traveling to the U.K. from Continental Europe are admitted to the U.K. at Brussels-Midi, Paris-Nord, and Lille-Europe and separated from other passengers by walls and fencing on special international platforms. In England, French border agents admit passengers to the Schengen Area also using specially designated

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<sup>42</sup> "Fact Sheet: Beyond the Border Pre-Inspection and Pre-Clearance." United States Department of Homeland Security, December 6, 2011, <https://www.dhs.gov/news/2011/12/06/fact-sheet-beyond-border-pre-inspection-and-pre-clearance>

<sup>43</sup> Ibid.

<sup>44</sup> "Cross Border Rail Passenger Service Progress Report." Transportation Border Working Group Detroit, Michigan, April 23, 2013, [www.thetbwg.org/meetings/201304/presentations/D1P7a.ppt](http://www.thetbwg.org/meetings/201304/presentations/D1P7a.ppt)

<sup>45</sup> Ibid.

<sup>46</sup> "Vermont And New York Senators Push For Improved Passenger Train Service To Montreal." May 24, 2012. Office of Senator Patrick Leahy, <http://www.leahy.senate.gov/press/vermont-and-new-york-senators-push-for-improved-passenger-train-service-to-montreal>

<sup>47</sup> Travelers between the Schengen Area and the U.K.-Ireland Common Travel Area must pass through customs. The U.K. and Ireland, unlike most European Union nations, are not a party to the Schengen Agreement.





international platforms. The system allows for more efficient train operations and provides for better passenger comfort.

## 8 CORRIDOR AT-GRADE CROSSINGS

The locations of railroad-roadway at-grade crossings are important considerations in the evaluation of any rail corridor as they may affect the safety and efficiency of freight and passenger rail service. As such, an at-grade crossing inventory has been prepared for the Corridor, with a full listing in the Appendix.

At-grade crossings are classified as Public or Private, with private crossings being further classified as farm, recreational, or industrial where that information is available. Public crossings are established in accordance with state and federal government regulations to provide continuation of a public road or right-of-way over a rail line and may be used by the public without restriction. Private grade crossings are typically established by agreement between the railroad and the users of the grade crossing. Private grade crossing access is generally granted for a specific purpose.

Warning devices are employed at many grade crossings to identify the presence of a grade crossing and, in the case of active devices, to warn drivers and pedestrians of approaching train traffic. The type of warning device installed at a grade crossing is dependent on a number of factors, including the amount of vehicular and pedestrian traffic, the frequency of train crossings, expected train operating speeds, and the type of trains (freight, passenger, or both) operating on the railroad right-of-way. Passive type warning devices include railroad cross-buck signs, stop signs, and other warning devices that alert a driver or pedestrian that a grade crossing is present, but does not provide a warning that a train is approaching. Active warning devices indicate the approach of a train and include flashing lights, bells and gates that close as a train approaches the grade crossing.

A summary of existing at-grade crossings on the Corridor are in Tables 8.1-8.4. Additionally, specific grade crossing locations are in Appendix Tables 1.28-1.30.

**Table 8.1. At-Grade Crossings: Boston to Springfield Summary**

Type	Number	None	Gates	Flashing Lights	Crossbucks	Other Signals	Stop Signs
Public	4	0	4	0	0	0	0
Private	11	7	0	1	1	0	2
Total	15	7	4	1	1	0	2

Source: Federal Railroad Administration

**Table 8.2. At-Grade Crossings: Springfield to the Canadian Border**

Type	Number	None	Gates	Flashing Lights	Crossbucks	Other Signals	Stop Signs	Other Activated
Public	131	3	51	51	20	1	5	3
Private	178	141	1	1	11	17	7	0
Total	309	144	52	52	31	18	12	3

*Source: Federal Railroad Administration*

**Table 8.3. At-Grade Crossings: Canadian Border to Montreal**

Type	Number	None	Gates	Flashing Lights	Crossbucks	Other Signals	Stop Signs	Other Activated
Public	50	3	14	29	3	0	1	0
Private	3	3	0	0	0	0	0	0
Total	53	6	14	9	3	0	1	0

*Source: Federal Railroad Administration*

**Table 8.4. At-Grade Crossings: Springfield to New Haven**

Type	Number	None	Gates	Flashing Lights	Crossbucks	Other Signals	Stop Signs	Other Activated
Public	33	0	30	0	0	0	0	3
Private	11	0	5	1	1	3	1	0
Total	44	0	35	1	1	3	1	3

*Source: Federal Railroad Administration*